Physical Activity Referral Schemes: Adherence and Physical Activity Behaviour Change

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Abstract

It is well known that engaging in physical activity (PA) reduces the risk of developing non-communicable diseases and improves general health. However, at the time of this research, less than half of the UK population met the recommended levels of PA (DH, 2010). Physical activity referral schemes (PARS) are one of the interventions available in primary care (NICE, 2006a) for disease prevention and health improvement, despite a high dropout rate (Gidlow, 2005) and unknown long-term effectiveness (Pavey *et al.,* 2011). The main aim of the four studies presented in this thesis was to explore the adherence and behaviour change towards PARS in Northamptonshire. The first study measured the long-term change in PA levels after participation in Activity on Referral (AOR). The key outcome was a significant increase in self-reported long-term PA levels (mean difference 1000 MET minutes/week) for 105 adhering participants from a total of 2228 participants. One in every 21 referred individuals self-reported an increase in PA at 12 months. To explore the high levels of non-adherence, an interpretative phenomenological analysis (IPA; Smith, 1996) was conducted with seven non-adhering AOR participants. The findings showed that being listened to at the point of referral, a range of positive experiences during the induction, alternative opportunities to increase activity, and potential to re-engage in PARS were some of the factors that enhanced adherence. Even though currently the key behaviour change measure for a PA intervention is an increase in PA, there is no gold standard self-reporting PA measure. Therefore, the third study was a comparison that tested the applicability of the new General Practice Physical Activity Questionnaire (GPPAQ) and the internationally validated International Physical Activity Questionnaire (IPAQ). The GPPAQ is recommended to be used as a screening tool by health professionals for the latest PARS called Let's Get Moving (LGM). There was a significantly weak association between IPAQ and GPPAQ. Hence, the GPPAQ is only recommended to be

used as a PA screening tool and not for evaluating PA levels for PARS research studies. The final study was based on the new LGM physical activity care pathway which included a brief intervention using Motivational Interviewing (MI), a communication style that elicits the individuals' ambivalence regarding PA. Eight out of 21 participants self-reported a PA increase at 6 months and the MI used during the PARS was coded at beginner level. The two PARS included in this thesis were compared for adherence; LGM adherence was 65% compared to 23% AOR adherence at 3 months. In conclusion, this research has demonstrated that PA levels do increase for PARS participants in the long term, but the dropout rate can be concerning. By using a mixed-methods approach, the lived experience of participants enhances the understanding of reasons behind non-adherence. The comparative study involving LGM and AOR samples showed that interventions with elements of MI might be a better investment of commissioned resources.

Acknowledgements

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Glossary of Abbreviations

AOR – Activity on Referral

DH – Department of Health

GPPAQ – General Practice Physical Activity Questionnaire

IPAQ – International Physical Activity Questionnaire

GP – General Practitioner

LGM – Let's Get Moving

MI – Motivational Interviewing

NCD – Non-communicable disease

NICE – National Institute of Health and Care Excellence

NQAF – National Quality Assurance Framework

NHS – National Health Service

PA – Physical activity

PARS – Physical activity referral schemes

PCT – Primary Care Trust

SDT – Self-determination theory

TTM – Transtheoretical Model

WHO – World Health Organisation

Chapter 1 Introduction

This chapter will outline the problem of physical inactivity, key UK Government policies, and behaviour change theories that have been used in physical activity (PA) studies. The epistemological approach of this research will also be detailed followed by an overview of the studies included in the thesis.

1.1 The Problem of Physical Inactivity

According to the World Health Organisation (WHO, 2003), the combination of an energy-dense diet and sedentary lifestyle, due to a reduction in occupational physical activity (PA), has resulted in an increase in the incidence of non-communicable diseases (NCDs). Some examples of NCDs are cardiovascular disease, some forms of cancer, diabetes, and chronic lung disease. The lifestyle-related factors responsible for the growing epidemic of NCDs are use of tobacco, unhealthy diet, increased alcohol consumption, and physical inactivity (WHO, 2011). A recent study showed that approximately 23.4 million deaths, 64% of all deaths in 23 low- and middle-income countries, were due to NCDs (Alwan *et al*., 2010). Booth *et al.* (2002) discussed physical inactivity as a disease in itself, suggesting sedentary behaviour triggers disease in activity genes and that PA may be "an effective weapon" against twenty contemporary NCDs. Indeed, Hippocrates (c.460-377 BC) believed that all parts of the body, which have a function, if used in moderation in accustomed labour, become healthy, well-developed, and age slowly, but if left unused, they become liable to disease, defective growth, and rapid ageing (Jones, 1967). The leading global risks for mortality in the world are high blood pressure accounting for 13% of global deaths, tobacco use, 9%, high blood glucose, 6%, physical inactivity, 6%, and

overweight/obesity, 5%, meaning physical inactivity is the fourth leading factor that may even influence the other factors (WHO, 2009). Physical inactivity is reported to directly cost the NHS £1.06 billion per year (Allender *et al.,* 2007), while sickness related to physical inactivity indirectly costs the Department of Health (DH) an estimated £8.2 billion per year (DH, 2004). Additionally, the annual cost of sickness and worklessness among working-age people is estimated to be over £100 billion (Black, 2008).

Further, mental illness is predicted to be the next major cause of disability in the world by 2020 (WHO, 2001). Depression is the most common mental health issue in community settings and can be defined as the loss of interest and enjoyment in ordinary experiences; depression encompasses a wide range of mental health problems (NICE, 2010) with a continuum of severity (Lewinsohn *et al.,* 2000). A recent review commissioned by the Kings Fund predicted an increase in the number of people with depression from 1.24 million in 2007 to 1.45 million in 2026 as well as an increase in the estimated NHS costs from £1.7 billion in 2007 to £3 billion in 2026. Total cost of depression including that from lost working days, is expected to rise from £7.5 billion in 2007 to £12.2 billion in 2026 (McCrone *et al.,* 2008). Sedentary lifestyle and physical inactivity lead to physical health problems as well as mental illness (e.g. depression) (Farmer *et al.,* 1988; Camacho *et al.,* 1991; Paffenbarger *et al.,* 1994). Hence, in the UK, physical inactivity is acknowledged to be a major health issue because of the associated NCDs, its impact on mental health, and the associated financial costs (DH, 2004).

PA is defined as any bodily movement produced by contraction of the skeletal muscles thereby substantially increasing energy expenditure (Caspersen *et al.,* 1985; Howley, 2001). Exercise, sports, recreation, walking, cycling, active

transport, occupational activity, and domestic activity including gardening are all examples of PA. In the 2008 Health Survey for England (NHS, 2008), only 29% of the females and 39% of the males in the UK met the recommended amount of PA. At that time, UK government guidance for PA was 30 minutes of moderate-intensity walk, 5 times per week (DH, 2004). The 2008 figures showed an increase from the figures for 1998 when 25% of all the females and 37% of all the males in the UK met the recommended PA levels (DH, 2004). The increase is modest, considering the Government target of 2 million people becoming active as a result of the inspiration from the Olympic Games in 2012 (Department for Culture Media & Sport, 2009). Even with the reported increase, there is a need to develop brief interventions for PA to support more individuals to participate in PA so that the impact of NCDs is potentially prevented and/or limited and mental health is enhanced.

1.2 PA as a Solution

PA has been identified as a key factor in a healthy lifestyle, besides a healthy diet, non-smoking, consumption of five portions of fruit and vegetables per day, and moderate alcohol intake, for reducing the risks of NCDs, improved mental health, and general wellness (Erikssen, 2001; Young & Harries, 2001; Nishida *et al.,* 2004; DH, 2004; Roberts & Barnard, 2005; Hardman & Stensel, 2009). This point is in line with the WHO (1946) definition of health: a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Some studies have reported causal associations between physical activity and reduced rates of CHD, hypertension, non-insulin-dependent diabetes mellitus, osteoporosis, colon cancer, and anxiety and depression (Pate *et al.,*

1995). Physical and mental benefits of a physically active lifestyle are outlined in the following sub-sections.

1.2.1 A brief overview of the physical benefits of PA.

Morris and Crawford (1958) conducted one of the first epidemiological studies that led to a new wave of research into the relationship between PA and health. They concluded that being occupationally or physically active reduced the risk of developing coronary heart disease (CHD) (Morris & Crawford, 1958M). Moreover, some studies have shown that an active lifestyle reduces the risk of CHD (Powell *et al.,* 1987; Manson *et al.,* 2002; Hamer & Chida, 2008) and other NCDs such as type 2 diabetes (Kirk *et al.,* 2003; Jeon *et al.,* 2007), obesity (Lahti-Koski *et al.,* 2002), stroke (Lawrence *et al.,* 2009; Middleton *et al., 2013*), and bowel cancer (Batty, 2000; Samad *et al.,* 2005). PA has also been reported to enhance musculoskeletal health and reduce the risk of osteoporosis and back pain (Vuori, 2001).

1.2.2 Mental health benefits of PA.

A physically active lifestyle is also reported to alleviate depressive symptoms (Lewinsohn, 1974) and improved general mental health (Lord and Green, 1995; Mental Health Foundation, 2005; Netz *et al.,* 2005; Saxena. *et al.,* 2005; Anderson & Shivakumar, 2013). PA is found to improve mental health (Craft and Landers, 1998) even at low intensity, i.e. 20 to 60 minutes per week (Teychenne *et al.,* 2008). Biddle *et al.* (2000) concluded that exercise is associated with mood enhancement, although they suggest their study results be interpreted with caution because of the weak research design as well as the dilemma of

which to affective state to measure. The Mental Health Foundation (2005) highlights that a substantial body of evidence shows a causal link between PA and reduced clinically defined depression and suggests PA can be as effective as medication or psychotherapy. However, Lawlor and Hopker (2001) concluded that using PA with clinical populations was inadequate for determining the effect of PA on reducing the symptoms of depression. According to Mead *et al.* (2009), exercise did seem to improve the symptoms of depression when they combined the results from 25 trials, although it is not clarified to date what quantity or type of activity is the most effective. With regard to the relationship between body and mind, Etnier *et al.* (1997) conducted a meta-analysis of studies on the relation between PA and cognition functioning. From 134 studies, they found a small effect size of 0.25, indicating PA has a limited positive effect on cognition. Furthermore, studies on the psychosocial affect of PA have shown that PA can reduce effects of stress and the potential development of physical ailments such as CHD and mental disorders including depression (Rimmele *et al.,* 2009). Overall, the evidence suggests that the PA needs to be continued in the long term for its benefits on mood to be sustained (Mead *et al.,* 2009). Lawlor and Hopker (2001) were considered "a bit harsh" by Brosse *et al.* (2002) because their definitive conclusions were restricted owing to a lack of dose-response studies rather than a lack of evidence (Dunn *et al.,* 2001a). Therefore, the results of Mead *et al.'s* (2009) review should be cautiously considered when generalising to the population of individuals experiencing depression within Primary Care, because this review consisted of studies with small samples, non-clinical settings, and short follow-up periods.

Since the early observations of the physical benefits of PA (e.g. Morris & Crawford, 1958), many studies have reported the positive relationship between

PA and physical/mental wellness (Bouchard *et al.,* 1994; Dishman *et al.,* 2004). The early pioneer of PA research, Morris (1994, p.807), referred to PA as "today's best buy for public health". Subsequently, government guidelines have promoted the benefits of a physically active lifestyle, encouraging individuals to increase PA levels in order to reduce the risks of NCDs and enhance mental health.

1.3 Government PA Guidelines

For general health benefits, the Government PA guideline specified by the Chief Medical Officer (CMO; DH, 2004) was 30 minutes of moderate-intensity PA sessions, 5 times per week, with moderate intensity defined as an increase in breathing/heart rate and body temperature (DH, 2004). This is in line with the earlier guideline specified by the Government of USA of adults performing 30 minutes of moderate-intensity PA on most, or preferably all, days of the week (DH and Human Sciences and Centers for Disease Control and Prevention, 1996), given the causal association between PA and NCDs (Pate *et al.,* 1995). During the course of this thesis (i.e., 2009 to 2012), the Government PA guidelines have changed. Adults aged 19 to 64 years, are now recommended to perform moderate-intensity PA for 150 minutes per week, including at least 2 days of muscle strengthening and general reduced sedentary activity (DH, 2011). This revision allows an individual to choose how to achieve the desired total amount of PA within a week, potentially enhancing autonomy in the behaviour change.

Many studies have looked into different levels of PA for sedentary adults and it was found that short bouts of 10-minute-long PA, accumulating to the

recommended 30 minutes are effective and may be less daunting to those trying to change their sedentary behaviour (Murphy *et al.,* 2002). Additionally, 30 minutes of moderate-intensity PA, 5 times a week may not be enough for the entire population and 60 minutes of PA per week may be appropriate for those who are already physically active (Blair *et al.,* 2004). The overall volume of PA is thought more important than the type or frequency (Bull *et al.*, 2010). Hence, daily PA, including gardening and walking, is considered as effective for some individuals as vigorous exercise is for other individuals (Wannamethee & Shaper, 2001).

With the evidence connecting PA to physical and mental health benefits, along with recommendations from the Government, the population could be expected, if working within a positive psychology framework (Seligman and Csikszentmihalyl, 2000), to embrace being physically active. However, this is not the case, as previous figures highlight more than half of the UK population is not physically active enough for gaining health benefits (DH, 2010). Consequently, the National Health Service (NHS) has developed PA interventions to support individuals with their PA behaviour change.

1.4 Evolving NHS PA Policy

Given the discrepancy between the actual and desired activity levels within the UK, the NHS has produced policies to promote PA. Currently, personalised behaviour programmes are considered the radical way forward to support individuals with behaviour change (H M Government, 2010). The DH rolled out the “At least five a week” programme, which presented comprehensive evidence on the impact of PA on health (DH, 2004). The policy emphasised on the

benefits of PA and mirrored the evolving Government strategy in promoting Physical Activity Referral Schemes (PARS) to collect, present, and review evidence of PA behaviour change in the long term (NICE, 2006a). At the national level, health is considered a choice and that the Government is responsible for enabling people to make healthy choices by providing the right environment (NHS, 2004). People should be encouraged to choose the right activity (DH, 2005), e.g. daily life activities, PA in the workplace, and sporting activities within communities, and perform PA to gain health benefits and improve life in general. The recent "Be Active, Be Healthy" publication (Department for Health, 2009) presented a range of practical options for increasing PA through initiatives like Let's Get Moving (LGM) which is a PA care pathway involving recruitment, screening, brief intervention of motivational interviewing (MI), physical activity, and review.

Alongside the evolving NHS policies, the National Institute for Health and Care Excellence (NICE) has published a practical guidance based on evidences on PA, to support health professionals when recommending PA behaviour change (Cavill *et al.,* 2006; NICE, 2006a, 2006b, 2007, 2009, 2010). The DH considers Primary Care an opportunity to promote PA to patients via effectively designed PARS (DH, 2007), including Activity on Referral (AOR) and LGM, whereby PA interventions aim to meet the needs of those most at risk with poor health (DH, 2009).

1.5 UK-based Legislative PA

The key physical activity guidelines across the four countries of the UK have been amalgamated into one policy of on PA, highlighting the concerted efforts

made to increase PA levels (DH, 2011). The "Start Active, Stay Active" (2011) policy emphasises on the importance of a life-course of regular PA, with the aim of changing sedentary behaviour. Besides, guidelines recommend that partnerships promote an active society, taking into account health, education, transport, social care, and environmental planning. Hence, the national guidance takes a holistic approach to encourage sedentary individuals become physically active. The consensus is that PA is important for wellbeing (Aked *et al.,* 2010) even though the evidence for this claim is still developing. In the first NHS mandate of its kind, PA is part of a preventative agenda, where every contact made with health professionals is used to prevent people dying prematurely (DH, 2012). That said, global awareness (WHO, 2009), UK PA policy (DH, 2011), and NICE PARS recommendations (NICE, 2006a) need to be practiced to enable PA behaviour change. Hence, an understanding of behaviour change theories may support the quest to enable individuals become more physically active in order to improve their physical and mental health. Behaviour change theories specifically applied to healthcare may support an effective match of participant and PA intervention (Glanz *et al.,* 2002), as currently there is no gold standard theoretical model used for PA interventions. The next section provides an overview of some theories that have been applied in the context of PA to support the discussion in the following chapters of this thesis.

1.6 Models of Behaviour Change

Behaviour change theories may shed light on the determinants of PA behaviour change, thereby enabling the designing of PA interventions for Primary Care that aim to support inactive individuals to be physically active in the long term

(Dishman *et al.* (1985). Bartholomew *et al.* (2006) emphasised on the importance of well-designed effective interventions that are guided by theory and informed by empirical evidence on the targeted behaviour. Changing human behaviour is a complex process and models of behaviour change can help us understand the processes people go through both for becoming more physically active and for maintaining the behaviour change, thus enabling effective use of resources. The research was conducted inductively whereby the practical outcomes of empirical studies on PA interventions were discussed in light of the theoretical frameworks thus adding to the current knowledge on behaviour theories in the context of PA to enhance adherence and PA levels for PARS.

Psychological and social psychological issues have been a major part of research conducted on the likely determinants of physical activity (Biddle & Mutrie, 2008), and, consequently, theories have been borrowed and developed from behavioural sciences. Early theoretical models concerning the nature of beliefs and the Health Belief Model (HMB; Becker *et al.,* 1977) were developed as an attitude-based model in health decision-making. The HBM suggests that individuals will not seek preventative health behaviours unless they have minimal amounts of motivation and knowledge, view themselves as vulnerable and the condition as threatening, are convinced the treatment will work, and see few difficulties in undertaking the action. The optimism reported in a meta-analysis based on HBM (Janz & Becker, 1984) was later questioned (Harrison *et al.,* 1992), so HBM not considered valid for application to PA behaviour change (Lindsay-Reid & Osborn, 1980; Biddle & Ashford, 1988) because it was an illness avoidance rather than health prevention model. Hence, the orientation of the model is not suitable for predicting PA behaviour, as preventative health

behaviour may be a more effective predictor of behaviour change than illness avoidance behaviour.

Attitudes to PA are important determinants of PA behaviour change (Biddle and Mutrie, 2008). The theories that emphasis on the intention of the behaviour being critical to behaviour change are the Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980) and the Theory of Planned Behaviour (TPB; Ajzen, 1991). Hagger *et al*. (2002) support the use of TRA and TPB in PA settings, reporting a correlation of 0.51 between intention and behaviour across 72 studies. Hence, TRA and TPB are considered instrumental in the move towards theoretically based PA research (Biddle & Mutrie, 2008). Nevertheless, people often fail to carry out their intentions (Gollwitzer, 1999; Orbell, 2000), so the challenge of translating intentions into behaviour may remain unfulfilled. The Transtheoretical Model (TTM, Prochaska *et al.,* 1992) and Self-determination Theory (SDT; Deci & Ryan, 1985) have been extensively applied in PARS research (Biddle & Mutrie, 2008) and provide a theoretical framework involving behaviour decision-making and control-related constructs within behaviour change. TTM, a popular theoretical framework used to design PA behaviour change interventions (Hutchison *et al*., 2009), is outlined below, with a review of the related PA literature.

1.6.1 Transtheoretical model.

TTM is a stage-approach model of behaviour change (Prochaska *et al.,* 1992). The theoretical model theorises a spiralling sequence of stages of change and originated from smoking cessation studies. Although TTM-based interventions are often referred to as stage of change, the TTM model has four dimensions:

stages of change, processes of change, decisional balance, and self-efficacy (Hutchinson *et al.,* 2009). The stages of change include pre-contemplation, contemplation, preparation, action, and maintenance (Prochaska *et al.,* 1992), with supporting processes of change including consciousness raising, dramatic relief, environmental re-evaluation, social liberation, self-re-evaluation, self-liberation, reinforcement management, helping relationships, counter conditioning, and stimulus control relative at each stage of change as seen in Figure 1.1.

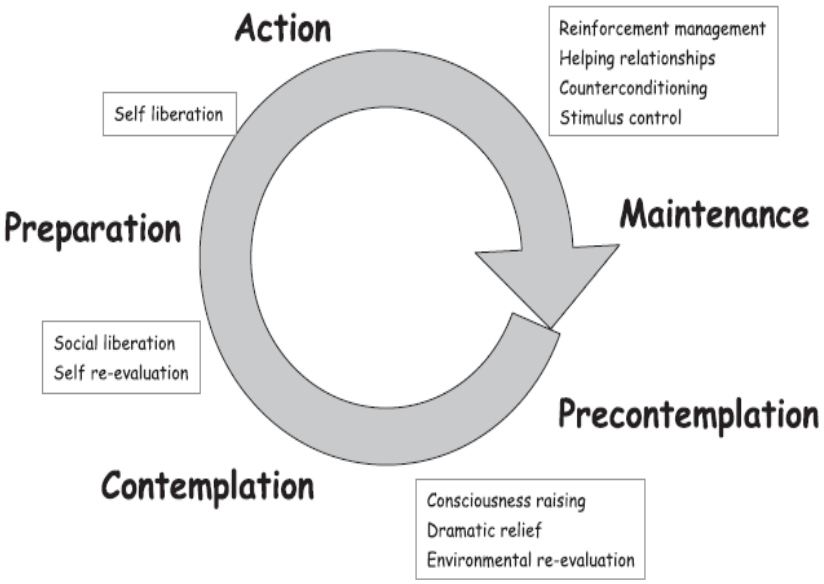


Figure 1.1. The Transtheoretical Model of behaviour change with stages identified in bold and processes in boxes. From "Why don't stage based activity promotion interventions work?" by J, Adams, and M, White, 2005. *Health Education Research,* 20**,** p. 239.

With regard to decisional balance, potential gains known as "pros" are thought to increase as the stage of change progresses and potential losses known as "cons" are thought to decrease as an individual adopts behaviour change

(Marshall & Biddle, 2001). Additionally, self-efficacy (Bandura, 1977) affects a person's choice of activities and how much energy and time one applies to overcome barriers and adverse situations. The higher the self-perceived self-efficacy, the stronger the coping efforts, and consequently the more likely the success of behaviour change efforts (Bandura & Adams, 1977). Although the original self-efficacy behaviour change model was explored in an experiment involving phobia of snakes, it could provide lessons that can be applied to other domains to with respect to de-sensitisation and reduction of anxiety and fear. Consequently, the barriers to behaviour change can be eliminated. Wallace (2002) suggested a relationship between low self-efficacy and no behaviour change. Figure 1.2 shows the link between perceived efficacy and the perceived outcome relating to the actual outcome of behaviour change. Hence, PA behaviour change interventions may require an understanding of expected barriers to changing sedentary behaviour to enable an increase in PA levels.

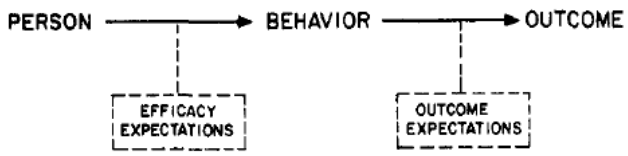


Figure 1.2. Diagrammatic representation of the difference of efficacy expectations and outcome following behaviour. From "Self-efficacy: Toward a Unifying Theory of Behavioural Change," by Bandura, A. 1977, *Psychological Review,* 84**,** 191-215.

Relapse, also experienced as non adherence to PARS, is considered part of the behaviour change process in the TTM, implying that behaviour change requires

more than one experience through the stages before reaching continuation (Prochaska *et al.,* 1992). Figure 1.3 shows the TTM as a spiral that includes possible outcomes of relapse and then potential of continued behaviour change, culminating in termination of past behaviour. Currently, there is no definition of termination of PA behaviour change as opposed to smoking behaviour change, i.e. smoking cessation for a smoker.

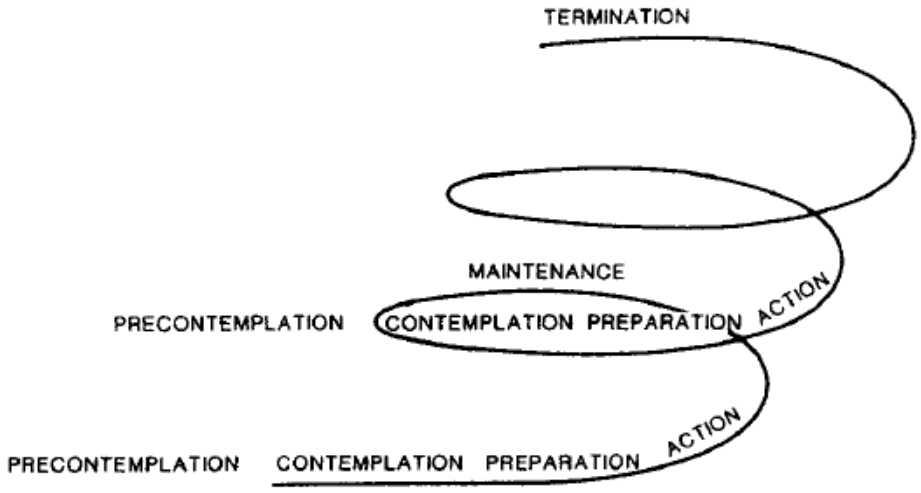


Figure 1.3. Stages of change represented as a continued spiral. Adapted from "In search of how people change," by J. O. Prochaska, C. C DiClemente, and J. C. Norcross, 1992. *American Psychologist,* **47,** 1104.

Interventions are very successful when accurately matched to the individuals for the appropriate stage of change (Prochaska *et al.,* 1992). Although the model was originally based on cessation of an activity (i.e. smoking) rather than uptake of behaviour (i.e. PA), there have been several reviews exploring the relationship between the stages of behaviour change with the intention to increase PA, and the model has been extensively applied within the PA domain (e.g. Marcus *et al.,* 1992; Marshall & Biddle, 2001; Riemsma *et al.,* 2002; Dallow & Anderson, 2003; Adams & White, 2005; Lorentzen *et al.,* 2007; Hutchison *et*

al., 2009). Riemsma *et al.'s* (2002) review of interventions using stages of change models for a variety of health-related behaviour changes concluded that there is little evidence for the effectiveness of stages of change-based interventions in promoting PA. Adams and White (2005) reported that even though stage interventions are oversimplified, some people benefit by increasing PA levels in the short term. Additionally, Brug *et al.* (2005) suggest it is better to understand for whom the TTM approach works. At less than six months after PA interventions, 75% of the studies (n = 18) reported a significant effect for TTM-based interventions over control conditions in stage progression or PA levels (Hutchison *et al.,* 2009). Hutchinson *et al.* (2009) are critical of the application of the TTM model to PA interventions, as only 7 out of the 24 interventions (29%) used all 4 dimensions of the TTM model. This finding supports an earlier review which suggested stage-matched interventions were of limited use in PA settings owing to the complexity of the PA behaviour change (Marshall & Biddle, 2001) including psychosocial factors (Lorentzen, 2007). Thus, by accepting that PA behaviour change is a journey rather than a predictable linear profile, support, particularly in relapse (Rodgers *et al.,* 2009), and a care pathway may accommodate those experiencing relapse, providing an opportunity for non-adhering individuals to re-engage in PA interventions. TTM was selected by the researcher to reflect the study outcomes because of the popularity of its use in PA settings, especially the stages of change which are the prominent components of the theory applied to PA interventions (Hutchinson *et* al., 2009). An alternative theoretical model to consider is the control-constructed SDT with the five sub-theories. During the course of this thesis, the prevalence and application of SDT started increasing in PA interventions (Teixeira *et al.*, 2012) and Motivational Interviewing (MI) was being linked with behaviour change

theories (Miller & Rollnick, 2012, Deci & Ryan, 2012), which was integral to Study 4 and the Let's Get Moving PA intervention. The next section will outline SDT to support the discussions in following chapters.

1.6.2 SDT.

SDT is increasingly being applied and recommended in the PA domain (Teixeira *et al.,* 2012), especially for behavioural maintenance (Biddle & Nigg, 2000; Rothman *et al.,* 2004). The inquiry into the quality of an individuals' motivational drive led to the development of SDT (Deci and Ryan, 1985) which is a broad framework based on human motivation and personality as well as the assumption that people are active organisms. With social nutriments and support, an individual will naturally develop tendencies to develop and grow. SDT is an evolving theory and currently includes five sub-theories (Vansteenkiste *et al*., 2010): Cognitive Evaluation Theory (CET), Organismic Integration Theory (OIT), Causality Orientations Theory (COT), Basic Psychological Needs Theory (BPNT), and Goal Contents Theory (GCT). CET, the first component theory of SDT (Deci, 1975) highlights the role of competence and autonomy in intrinsic motivation (i.e. adopting a specific behaviour for its own sake; Rummel & Feinberg, 1988; Cameron & Pierce, 1994). OIT concerns determinants and consequences of extrinsic motivation which are classified as external regulation, introjections, identification, and integration. The internalisation process of these motivations can be seen in Figure 1.4; autonomy and relatedness enable internalisation. CET and OIT detail the social-environmental conditions that facilitate motivational processes; CET focuses on the effects of specific social-contextual variables on intrinsic motivation, whereas OIT is focused on the environmental factors conducive to internalisation of

extrinsic motivation (Deci & Ryan, 1985). COT encompasses three causality orientations of people towards an environment and regulation of behaviour; autonomy orientation whereby the person acts out of value and interest, control orientation whereby the focus is on rewards or approval and the third orientation being amotivated, characterised by an associated concern of competence. BPNT refers to the psychological needs of autonomy, competence, and relatedness for psychological health and well-being (Ryan & Deci, 2000). Competence defined as a positive feedback loop that one has the ability to do the task, which may also be a social competence of others acknowledging the individuals competence. Autonomy means being self-directed and relatedness means the connection to others and/or the environment. Wellness is achieved when all three needs are supported whereas thwarting autonomy, competence, and or relatedness has a negative impact on wellness (Ryan & Deci, 2000). GCT elaborates the distinction between intrinsic and extrinsic goals (McLachlan and Hagger, 2011), whereby extrinsic goals (i.e. financial success, fame, appearance) are associated with lower wellbeing than intrinsic goals (i.e. close relationships and personal growth). Positive behaviour outcomes are considered positively related to self-determined PA motivation (Ryan and Deci, 2000). Ryan and Deci (2000) suggested that people start life with abundance of intrinsic motivation and over time, through life experience, evolve and adapt passivity rather than keenly learning and progressing. Hence, supportive environments are required to naturally develop the intrinsic motivation for sustained behaviours. In addition to behaviour change, the concept of vitality is included in SDT. When needs are satisfied, vitality, which has been reported to increase with outdoor PA, is enhanced (Ryan *et al.,* 2010), suggesting that contact and relatedness with other living things including nature enhances wellbeing.

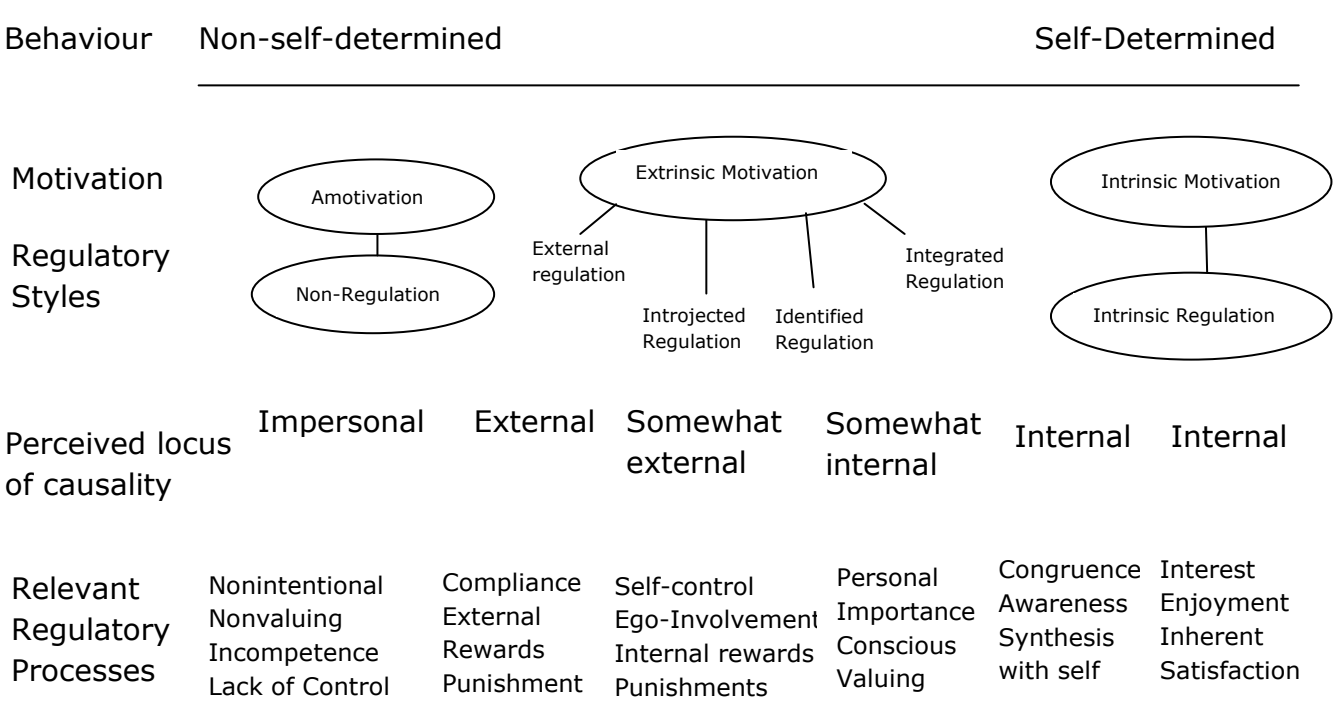


Figure 1.4. Self Determination continuum show types of motivation (OIT) with regulatory styles, perceived loci of causality and corresponding processes. From "Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being," by R.M. Ryan and E. L. Deci, 2000, *American Psychologist*, 55, p. 72.

Dishman *et al.* (1985) suggested that extrinsic motivation such as knowledge and benefits to health are important for motivating one to adopt a PA behaviour change, although over time, intrinsic motivating factors, i.e. enjoyment, competence, and social interaction, tend to be more important in determining adherence to PA when compared to fitness and physical appearance (Ryan *et al.,* 1997). The intrinsic goals (e.g. health and wellness) are considered more effective in maintaining behaviour change than external goals (e.g. image), while enjoyment and stimulation from the PA itself has been reported to support adherence to PARS (Morton *et al.,* 2008). Resources are effectively used when

an individual is intrinsically motivated because autonomous individuals are able to help themselves rather than rely on services for the motivational drive. Further research on PA interventions based on the sub-theories comprising SDT (detailed earlier) is recommended in order to better understand the participants' cognition that leads to their emotional and behavioural response during a PA intervention (Morton *et al.,* 2008; Silva *et al.,* 2008), including the effects of autonomously supporting environments (Rouse *et al.,* 2011). Clinical based PA SDT trials have shown motivation to be PA is variable (Fortier *et al.,* 2007; Silva *et al.,* 2010). Hence, an individual involved in a PARS could be initially supported to develop their competence to do PA, providing an autonomously supporting environment by acknowledging their choice and being involved in the decision process whilst also developing relatedness in relationships established with others/the environment. A diagrammatic representation of the SDT process with all sub-theories for PA can be seen in Figure 1.5.

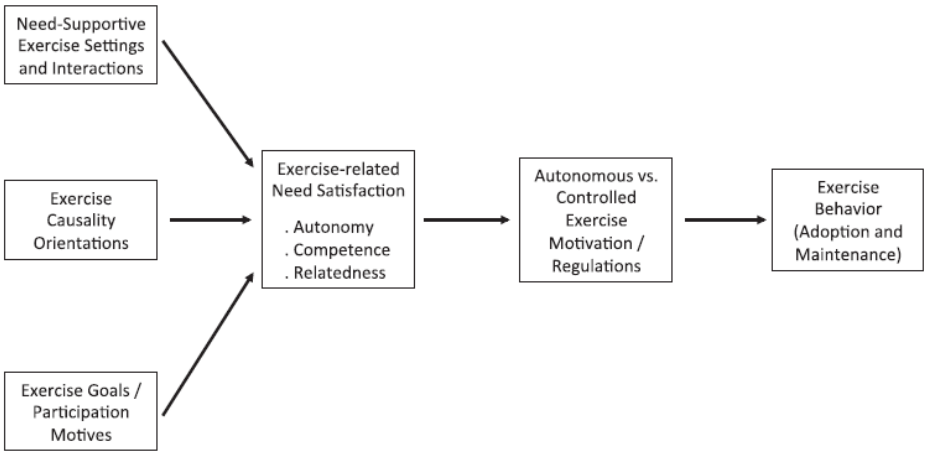


Figure 1.5. General SDT process model for exercise behaviour. From "Exercise, physical activity, and self-determination theory: a systematic review," by P. Teixeira, P., Carraca, E., Markland, D., Silva, M. and Ryan, R, 2012, *International Journal of Behavioural Nutrition and Physical Activity,* 78, 4.

A recent systematic review of 66 empirical studies concluded, "There is good evidence for the value of SDT" (Teixeira *et al.,* 2012; p.26), as autonomous motivation may lead to sustained PA behaviour and perceived competence to perform PA positively predicts PA behaviour outcomes (Teixeira *et al*., 2012). While some studies have looked at TTM and SDT separately, others have combined the two theoretical frameworks. Additionally, Motivational Interviewing (MI) communication style has been used as a practical means to apply the theoretical frameworks.

1.6.3 SDT, TTM, and MI.

Following the recommendation to integrate SDT with the stages of change theoretical models (Landry & Solomon, 2002; Mullan & Markland, 1997), combined theoretical models have been applied within PA longitudinal studies (Buckworth *et al.,* 2007; Ingledew *et al.,* 1998). Recently, trials investigating the PA motivations for populations of individuals with ill health have been conducted (Fortier *et al.,* 2012). The researchers reported that intrinsic motivation is related to an increase in PA levels, but the specific relationship between each motivational stage and the determinants that increase the intrinsic motivation to be physically active after six months was unknown.

In order to bridge the gap between theoretical models and practical application, Dishman *et al*. (1985) recommended that research should aim to understand personal motivation for maintaining PA. Alongside the theoretical models, motivational interviewing (MI) communication style has been used to communicate the theoretical understanding in practical behaviour change settings in Primary Care (Rollnick *et al.,* 2008). MI, although not a theory (Miller & Rollnick, 2009), is a communication style aimed to enhance motivation, "compatible" to the stages of change of TTM (Miller & Rollnick, 2013, p.35) and is considered complimentary to SDT (Patrick & Williams, 2012). MI is discussed in detail in Chapter 5.

1.6.4 Summary.

The problem of physical inactivity has been outlined at the beginning of this chapter, and the motivation to ignite the behaviour change may require an intervention to provide support to individuals within Primary Care to change

sedentary behaviour for improving their physical and mental health. Theoretical models may provide a framework for the design of such interventions. Biddle and Mutrie (2008) suggested that a theoretical framework helps make sense of the diversity of determinants of PA and hence researchers can use them as the bases for their investigations. This enables past knowledge to be revamped and elements of the model to be tested so that the theoretical understanding of the problem can be enhanced. Whereby practical application being a primary outcome as opposed to only testing theoretical frameworks during research when developing an understanding of PA behaviour change. As mentioned above, there is no gold standard model to adopt for PA behaviour change at present.

The behaviour change models briefly outlined above acknowledge internal and external factors that may influence behaviour change. Furthermore, evidence for physical and mental benefits of PA has supported the efficacy of government initiatives, leading to the development of PA brief interventions in Primary Care to support sedentary patients become physically active. One such commissioned physical activity behaviour change scheme is Activity on Referral (AOR), whereby an individual is referred by a health professional to a fitness professional at a leisure centre. In this thesis, an inductive process was used to discuss the abovementioned theoretical models for evaluating one of the current PARS in Northamptonshire, with a focus on understanding how to increase adherence to the schemes to promote PA. This research has been designed to explore the current situation in terms of PA interventions and to enhance theoretical understanding based on findings of the field study, using the most prominent theories currently applied to PA interventions (i.e. TTM and SDT) whilst adding to the methodological and practical knowledge of PARS research.

1.6.5 Gaps in literature

The rationale behind each study is included within the corresponding Chapters in this thesis. This thesis aims to fill the following key gaps identified in the literature: the long-term effect of PARS on PA levels and the lived experience of non-adhering participants. Additionally, the new PA intervention, LGM has been tested for feasibility, although the impact of LGM on PA levels is unknown and the applicability of the recommended screening tool is unknown as opposed to that of the validated PA self-reporting questionnaire. Moreover, the impact and reliability of the MI communication style used in LGM is unknown. Therefore, the main aim of this research was to determine the adherence and PA behaviour change elicited by PARS in Northamptonshire.

1.7 Epistemological Approach

This research was conducted from an ontological pragmatic perspective which is a philosophical approach that aims to match the specific research questions to issues as opposed to universally advocating a specific approach (Patton, 1990). Hence, epistemological positions of both positivism and constructivism were blended into a bimodal research (Nau, 1995), using a pluralistic approach. The researcher therefore adopted a mixed-methods approach, drawing from the strengths and minimising the weaknesses of the often polarised paradigms of quantitative and qualitative research methodologies (Johnson & Onwuegbuzie, 2004). Specifically, a slant towards positivism was adopted for Study 1, 3, and 4, where quantitative data were collected to measure attendance and PA levels by using longitudinal surveys to measure long-term PA levels after PA interventions. On the other hand, a slant towards constructivism was adopted

for Study 2, where qualitative data were collected and analysed using interpretative phenomenological analysis in order to understand the lived experience of non-adhering AOR participants. Study 2 was designed to address concerns of validity in a qualitative inquiry (Sparkes, 1998), the detail of which can be found in Chapter 3 of this thesis (Section 3.2).

The rationale behind each study is detailed in respective Chapters of this thesis. The following section provides an outline of the Chapters included in the thesis and a summary of the research contributions.

1.8 Thesis Outline and Research Contribution

This thesis contains six chapters and four empirical studies (Figure 1.6).

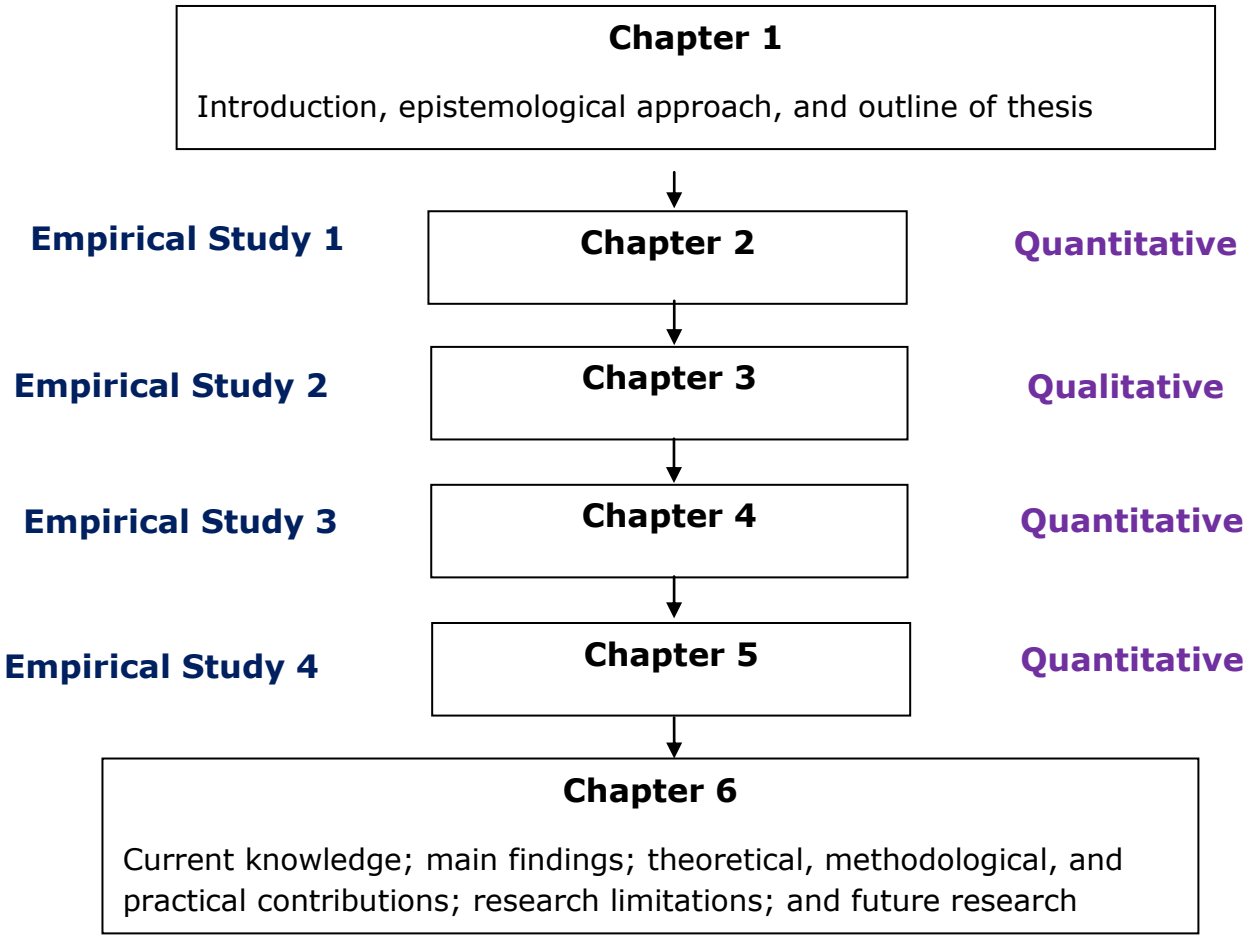


Figure 1.6 Structure of thesis.

The studies included in this thesis were developed from an initial Primary Care Trust (PCT) commissioned study to explore the effectiveness of the AOR scheme in Northamptonshire, an existing commissioned PA intervention. The primary aim of the intervention was to increase PA levels of sedentary patients as it is unknown if PARS led to long-term PA behaviour. The adherence to PARS is a concern, but it is not known if the problem of non-adherence is applicable to

AOR in Northamptonshire. Therefore, Study 1 measured the PA level increases and long-term adherence to PA with respect to the AOR scheme in Northamptonshire. Acknowledging the high dropout rate for the PARS in Study 1 and the concern for rigour when using a qualitative approach (Section 3.2), Study 2 aimed to collect the lived experience of non-attendees. During the timeframe of Study 1 and Study 2, the AOR scheme was de-commissioned owing to budgetary constraints in public health. Alongside the decommissioning, the government guidance on PA interventions was updated and included the LGM physical activity care pathway. The PA level for LGM was screened using the General Practice Physical Activity Questionnaire (GPPAQ). Study 3 aimed to calculate the correlation between an internationally validated questionnaire (International Physical Activity Questionnaire) and the recommended GPPAQ screening tool; this was done to explore the applicability of a concise and simple self-reporting questionnaire which is being advocated as a screening tool for a PA intervention. The final study (4) in this thesis explored the adherence levels of the LGM intervention, PA levels, and self-reported depression, as specified by public health commissioners. LGM was tested for feasibility, although the long-term impact on PA levels was unknown. The new PA care pathway includes the MI communication style to explore ambivalence and involves engaging, focusing, evoking, and planning appropriate PA. Hence, Study 4 measured the reliability of MI delivered during an LGM pilot in Northamptonshire. The concluding chapter of the thesis brings together the key learning points from the studies, contribution to theoretical understanding (SDT & TTM; Section 1.6), and details the methodological and practical contributions for future PARS research. The chapter concludes with limitations to the research and recommendations for future study. In addition to this thesis, research contributions during the timeframe of

this study have included: An AOR evaluation report for public health commissioners in Northamptonshire, International conference presentations, practical seminars, and publication of a peer-reviewed journal article[1]. Details of research dissemination to date are given in Appendix A.1.

1.9 NHS Ethics

Ethical approval for the research study 10/H0406/14 was granted by the NHS on 24th March 2010 by Leicestershire, Northamptonshire, and Rutland Research Ethics Committee. Research and development approval was granted on 21st July 2010 by the Northamptonshire Primary Care Trust. A subsequent substantial amendment was approved on 20th July 2010. A minor amendment was granted on 12th November 2010. A research passport was granted on 11th October 2010 from Northamptonshire Primary Care Trust.

[1] Clarke, K. & Walker, N. (2013) Getting off the starting blocks: An interpretative

Chapter 2 Northamptonshire Activity on Referral: October 2009 - September 2010 (Study 1)

2.1 PA interventions in UK Primary Care

It is estimated that in a three-year period, approximately 95% of the UK population will visit a GP or health care professional. Of these patients, only one in four will be physically active on a regular basis (DH, 2001). A PA brief intervention for sedentary patients may be appropriate for one in nine consultations (NICE, 2006d) and hence GPs in Primary Care are strongly encouraged to prescribe PA where appropriate and to routinely ask about exercise behaviour as a vital sign of health (Khan *et al.,* 2011). Graham *et al.* (2003) consider health professionals a very credible source of health advice and therefore likely to be influential in PA behaviour change (Dugdill *et al.,* 2005).

2.2 Physical Activity Referral Schemes (PARS)

NICE (2006a) recommends four PA interventions in Primary Care: use of pedometers, walking or cycling, community-based projects, and PARS. PARS are sometimes referred to as Exercise Prescription (EP) (Martin & Woolf-May, 1999), Exercise Referral Scheme (ERS) (NICE, 2006a), and/or AOR (Northamptonshire PCT, 2008). The aim of a PARS is to engage populations of sedentary individuals with health issues that require support from fitness professionals for obesity, mobility, and depression, to ensure their exercise programme is appropriate

considering the individuals' health risks (DH, 2009a). At the time of this research, sedentary individuals can be described as people who do not perform 30h minutes of moderate PA, 5 times per week (DH, 2004).

Since the introduction of PARS in the 1990s, there has been a rapid growth in the number of PA interventions. In 1997, there were 157 known schemes and 35 under planning (Fox *et al.,* 1997). The latest PARS review highlighted that across the UK, more than 600 schemes are rolled out per year (Pavey *et al.,* 2011). However, this may be a modest estimate considering Squire (2001) reported approximately 700 active schemes back in 2001. This difference may be due to a lack of national PARS co-ordination, despite the presence of national guidelines (DH, 2001).

Because a large number of PARS delivery guidelines were developed for GPs (Hammond & Brodie, 1997), the national quality assurance framework (NQAF) was subsequently published (Department for Health, 2001). It outlines guidelines for health/fitness professionals with delivery and commissioning guidance including the evaluation of effectiveness (Figure 2.1). The NQAF states that besides advice giving the PARS involve recommending exercises, offering patients vouchers to attend exercise facilities, and exercise referral via a systematic individualised process (DH, 2001, p.vii).

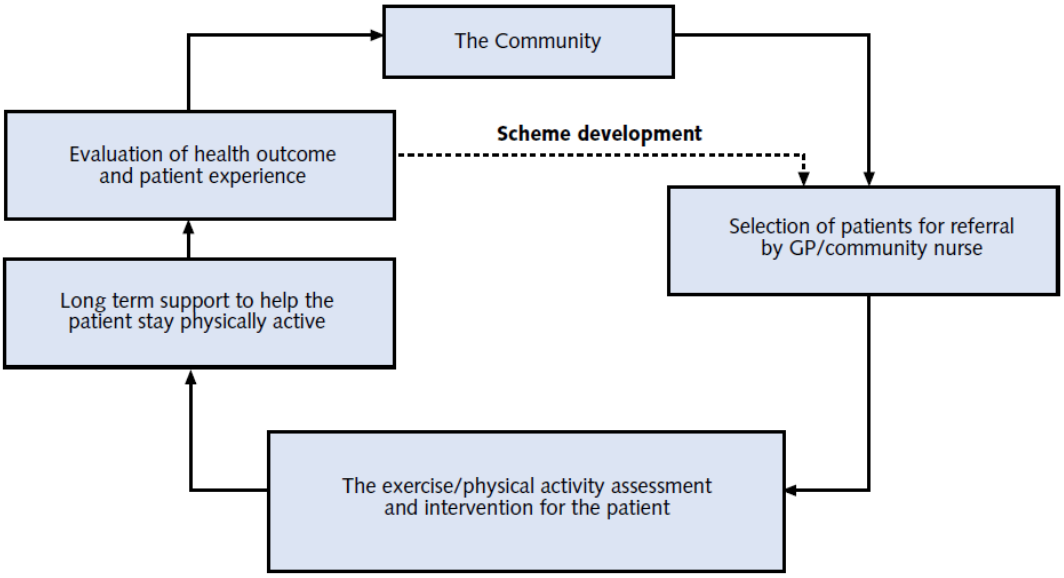


Figure 2.1 A patient-centred model for exercise referral. From "*Exercise Referral Systems: A National Quality Assurance Framework," by* Department of Health, 2001, London, Stationery Office Ltd, p.17.

The guidelines emphasise on the partnership required between the health and fitness professionals to provide an effective PA behaviour change intervention, hence the both health outcomes and patient experience are evaluated. The PARS aims to meet the health needs and expectations of the patient whilst also considering the patient's readiness to change (DH, 2001). The quality assurance guidelines suggest that a theoretical approach is not required (i.e. Hardcastle *et al.*, 2008) but one that reflects everyday practicalities (DH, 2001, p.13). Evaluation within the framework should include reflective practice, audit, and/or controlled study (DH, 2001). Reflective practice allows a critical practitioner to develop local interventions and share best practice; an audit enables a commissioner to assess the impact of the intervention, and a controlled study could help inform policy-makers of the effect of the schemes. It should however

be noted that the gold standard RCT is not always thought to be the best method as the least active individuals are less likely to enter a study or complete follow-up assessment (DH, 2001). The Public Health Interventions Advisory Committee (PHIAC) stated that PARS should only be commissioned when a research study also aims to determine effectiveness of PA interventions (DH, 2007). According to NICE (2006a), effectiveness needs to be measured longitudinally after one year to assess long-term behaviour change and PA levels, knowledge, skills, and attitude – these measures were included in Study 1.

2.3 Effectiveness of PARS

According to Dugdill *et al.* (2005), vague DH guidelines leave practitioners unsure of what to measure for PARS effectiveness and has resulted in challenges when collating the evidence across different studies (NICE, 2006c), mainly because different outcome measures are used across the different studies, including the variation in PA measures which limit meta-analysis (Isaacs *et al.,* 2007). In response to NICE (2006a) recommendations for quality-controlled research effectiveness studies on PARS, the British Heart Foundation has recently published a toolkit to support professionals to evaluate PARS (British Heart Foundation National Centre, 2010). The toolkit includes guidance for professionals delivering the scheme and templates for evaluations (http://www.bhfactive.org.uk/sites/Exercise-Referral-Toolkit/index.html). However, this toolkit includes non-validated questionnaires (i.e. self-efficacy and stage of change) and hence may not resolve the issue of non-comparative evaluations across schemes, as researchers choose to develop their own study designs. At the time of designing this research, the toolkit was not available.

Since the introduction of an early evaluation of a community-based referral programme (Campbell *et al.,* 1985), a number of studies have looked into the efficacy of such schemes (Stevens *et al.,* 1998; Taylor *et al.,* 1998; Harrison *et al.,* 2005, Morgan, 2005; Isaacs *et al.,* 2007; Gusi *et al.,* 2008; Sorensen *et al.,* 2008; Jolly *et al.,* 2009; Murphy *et al.,* 2010), enabling meta-analysis via systematic reviews (Sorensen *et al.,* 2006; Williams *et al.,* 2007; Pavey *et al.,* 2011) and summarisation of large volumes of information. The findings from these studies can be grouped into variables such as attendance/adherence, PA behaviour change, social outcomes, reason for referral, cost effectiveness, and the impact of health professional. The following section will review the PA literature for each variable.

2.3.1 Attendance and adherence.

To date, there is no consensus among scholars regarding attendance and adherence to PA interventions. A review of nine studies across the UK reported a dropout rate of 80% (Gidlow *et al.,* 2005). Contrarily, in the same year, Dugdill *et al.* (2005) reported positive outcomes of 34–46% adherence to a 12- and 14-week exercise referral scheme, probably because a variety of PARS pathways were commissioned across the UK to meet local needs, resulting in non-standardised interventions which produced the positive outcomes. However, low attendance and adherence rates of PARS are matters of concern when evaluating effectiveness of resources within Primary Care (Gidlow *et al.,* 2005, Williams *et al.,* 2007). For example, 60% (n = 252) initial uptake of participants attending an exercise referral scheme in Stockport, reduced to 18% engagement at 10 weeks and to 14% at 6 months (Lord & Green, 1995). In another study, only 35% of the participants attended their first appointment and this proportion

reduced to 25% at the 10-week review (Stevens *et al.,* 1998). Attendance levels are also a concern for those that initially engage, even when a financial incentive is offered. A mean attendance of nine out of a possible twenty half-price sessions was reported for the Hailsham PARS; 87% used the exercise prescription, with just 28% completing 75% of the sessions (Taylor *et al.,* 1998). Harland *et al*. (1999) reported that 82% attended their motivational interview session during the Newcastle PARS, and of the 180 participants receiving vouchers for free access to leisure facilities, 41% used at least one. With respect to the impact of PA interventions on physical health outcome, at 6 months after a 10-week PA programme, compared to low adherers, high adherers that attended 15 or more out of 20 sessions showed a significant reduction (7.2%, 9 mmHg) in systolic blood pressure. Additionally, compared to the control group, high adherers had a 9.2% skin-fold reduction up to 26 weeks from baseline (Taylor *et al.,* 1998). When considering specific populations, Gidlow *et al.* (2005) reported a higher joining rate for females than males (60% versus 40%) although there was no evidence of high attendance. A recent exercise referral scheme review conducted in Wales aimed to address the limitations of low attendance identified in the literature to date. A third of non-attendees re-joined the Welsh PARS when contacted within 4 weeks and had an average completion rate of 44%, with a sizeable variation between 11% and 62% (Murphy *et al.,* 2010). Despite the follow-up at 4 weeks, an average of 56% participants failed to complete the PARS.

Fox *et al.* (1997) expressed concern about the impact of PA intervention on the general population, as the community-based and leisure centre PARS trials reviewed less than 1% of the patient base, even though the studies highlighted successful recruitment and increased PA levels. A decade later, Williams *et al.*

(2007) conducted a comprehensive review of PARS, including 18 studies specifically within Primary Care including RCTs, non-randomised studies, observational studies, process evaluations, and a qualitative study. They concluded that PARS significantly increased sedentary behaviour to moderate PA, with a small effect of only 1 in 17 (6%) attendees adopting moderate PA.

The reason for referral may have an impact on PARS engagement and adherence. Morgan (2005) concluded that PARS may be more effective when tailored for patients requiring PA by a fitness professional (i.e. patients that are slightly active, overweight, and older). Dugdill *et al.* (2005) comment that those referred for key life-changing health episodes such as myocardial infarction have double adherence compared with those referred for mental illness. Whilst referral uptake and attendance for those referred for mental health is a concern (Crone *et al.,* 2008; Murphy *et al.,* 2010), a study involving 2767 participants showed a significant difference for mental health and physical health referrals between 2000 and 2003: completion rates were 22% for mental and 34% for physical referrals (Crone *et al.,* 2008). Mental health improvement was also reported in a study showing a positive reduction in depression levels by pooled standardised mean difference of -0.82 (95%, CI -1.28 to -0.35; Pavey *et al.,* 2011). Additionally, the selection criteria for PARS is emphasised on to enhance effectiveness (Riddoch *et al.,* 1998) as is providing a range of activities as part of a PARS to meet needs of participants (Thurston & Green, 2004; Morgan, 2005).

Financial incentives were offered to participants during PARS (Taylor *et al.,* 1998; Harland *et al.,* 1999; Cochrane & Davey, 2008). Harland *et al.* (1999) reported the most intensive scheme including motivational interviewing (detailed

in Chapter 5) and financial incentives of free access to physical activities to be most effective, albeit this adds to the cost and has an impact on the cost effectiveness of the PA intervention.

2.3.2 PA behaviour change.

Those that did attend and adhere to PARS showed PA behaviour change in the short term (Williams *et al.,* 2007). A study conducted by Clarke (1996) reported that 84.4% of PARS participants were taking part in some form of PA compared to 68.8% of comparison group at 6 months. Dugdill *et al.* (2005) reported moderate PA levels to increased by 21 minutes per week when compared to baseline measures. A high-quality randomised controlled trial (RCT) and cost effectiveness analysis report of NICE (2006c) calculated a 10.6% net reduction in the number of sedentary people in the study group (Stevens *et al.,* 1998). However, PA increase was not maintained in the long term (Harland *et al.,* 1999; Harrison *et al.,* 2005; Morgan, 2005).

From four RCT reports, NICE concluded that PARS had a positive effect on PA levels in the short term (6 to 12 weeks) but were ineffective in increasing PA levels in the longer term (e.g. 12 weeks or more than 1 year; NICE, 2006e). However, other robust controlled trials have been conducted since the NICE presented its report. In one such trial, one year after intervention, the PA level was found to increase in 30.6% of the members of the intervention group as opposed to 18.3% of the members of the control group (Cochrane & Davey, 2008). Furthermore, Williams *et al.* (2007) reported a significant increase in moderate PA levels in their meta-analysis (combined pooled risk 1.20; 95% CI 1.06-1.35). The National Exercise Referral Scheme (NERS) in Wales reported the

intervention group that underwent MI had higher levels of PA than those in the control group (odds ratio 1.19 [95% CI 0.99 to 1.43]; Murphy *et al.,* 2010). However, the latest systematic review concludes there is weak evidence of moderate PA of 90 to 150 minutes/week across 8 RCTs, with a pooled relative risk of 1.16 (95% CI 1.03 to 1.30; Pavey *et al.,* 2011). Consideration of theoretical components such as TTM and SDT for PA intervention is recommended (Williams *et al.,* 2007) and studies based upon behaviour change theory have been designed (Jolly *et al.,* 2009) to develop a more robust framework to support the complexity of PA behaviour change. This is not a clear solution, as an early-stage matched intervention yielded no difference in a control group (Naylor *et al.,* 1999) and AOR itself is not currently thought to be more effective than other PA interventions (Pavey *et al.,* 2011).

2.3.3 Social engagement during PARS.

Relational and enjoyment factors of AOR are considered important when evaluating effectiveness for long-term PA behaviour change (Thurston & Green, 2004). Community-based referral programmes have been found to positively change PA behaviour compared to programmes designed for control environments (Campbell *et al.,* 1985; Cochrane & Davey, 2008). Social benefits of PA have been highlighted in some PARS reviews (Martin & Woolf-May, 1999; Hardcastle & Taylor, 2001; Wormald & Ingle, 2004; Taylor & Fox, 2005). Thurston and Green (2004) support a sociological approach to PARS, especially for older adults. Thus, by addressing the social needs of engagement, the effectiveness of PA interventions may increase. A comparison of characteristics via semi-structured interviews of finishers who completed 20 or more sessions in

a 10-week programme and non-finishers who completed less than 20 sessions within a 10-week programme of a PARS in Margate showed that social support was a determining factor for those that did not complete and not very important for those that completed the scheme (Martin & Woolf-May, 1999). Being part of a social network and enjoying the activity may be important aspects of PARS that encourage adherence to PA (Hardcastle & Taylor, 2001). In support of this, a qualitative study suggested that the effectiveness PARS can be increased by including activities that offer social interaction (Wormald & Ingle, 2004).

2.3.4 Cost effectiveness.

When calculating the cost effectiveness of PARS, the diversity of measuring outcomes can be challenging. A NICE (2006c) report suggested some costing effectiveness demonstrated by RCTs (Figure 2.2).

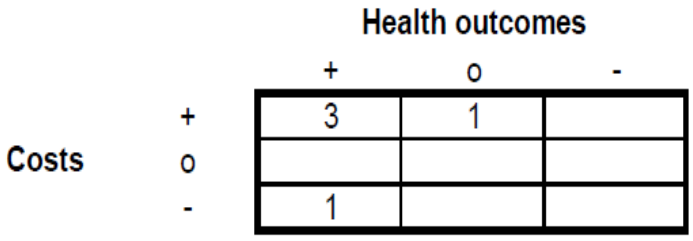


Figure 2.2. Cost versus Health outcomes. From "*Rapid review of the economic evidence of physical activity interventions," by* National Institute for Health and Care Excellence, 2006c, London: Matrix Research Consultancy, p.17.

Figure 2.2 shows that three studies were more costly and produced positive outcomes compared to an alternative. One study cost more without the health benefits and one study cost less than the alternative with positive health outcomes.

A recent costing review calculated the mean cost of a PARS to be £385 per participant and PARS participants reported willingness to contribute £2.27 ± £1.65 for classes (Murphy *et al.,* 2010). Stephens *et al.* (1998) estimated it would cost £623 per person to prescribe exercise to 45–74-year-olds and £327 for entering a higher PA group. Hence, there is variation in the cost of PARS across the UK. The average investment for PARS is estimated to be £100,000 (£77,000–£133,000) (NICE, 2006d). The investment quoted for the AOR Northamptonshire Scheme from March 2008 to March 2011 was £981,576 inclusive of delivery, marketing, and research costs (Northamptonshire PCT, 2008). Therefore, effective use of resources and financial investment of public money is imperative.

2.3.5 Impact of the health professional on PARS effectiveness.

The communication style used by health professionals is thought to affect patient outcomes (Stewart, 1995). McKenna *et al.* (1998) reported that promotion of PA is unlikely if the health professionals are not physically active themselves, hence the interaction at the point of referral can be a barrier to behaviour change. Lawlor *et al.* (1999) suggest that GPs had the expertise for referring patients who stand in need of PA; however, their consultation time and other prioritised concerns were barriers to actually promoting PA. One of the emerging themes in Dugdill *et al.'s* (2005) study was that participants referred from cardiac rehabilitation and practice nurses adhered more often than participants referred by their GPs. Recently, the extent of missed opportunity for PA referral in primary care was made evident in the Darzi report (2008): 54% of the survey participants did not receive information regarding exercise and diet from their GPs.

Owing to lack of supporting evidence for long-term effectiveness of PARS (NICE, 2006e), health professionals may be hesitant to recommend PA interventions. However, from 2004 to 2007, the GPs' awareness of exercise referral schemes has increased, especially in cases of depressed patients: 4% of the GPs referred patients to a PA intervention in 2004, and 21%, in 2007 (Mental Health Foundation, 2009).

2.3.6 PARS research recommendations.

PARS are referral schemes for PA behaviour change. From early personal and community-based PARS that emphasised on the value of personal

communication between the health professional and patient (Campbell *et al.,* 1985) and after 20 years of research, the best way forward to promote PA behaviour change remains unknown (Hillsdon *et al.,* 2002; Pavey *et al.*, 2011). Effectiveness of PA behaviour change is considered an important debate rather than effectiveness of exercise referral (Dugdill *et al.,* 2005). Hence, for Study 1 and Study 4, PA levels are measured. The latest systematic review of published material from 1990 to 2011 included eight studies (N = 5190 participants). The review concluded that there is weak evidence of even short-term PA behaviour change when compared to usual care or alternative referral schemes (Pavey *et al.,* 2011). This is in contrast with the message from previous systematic reviews which concluded that there were short-term PA increases (Morgan, 2005; NICE, 2006e; Sorensen *et al.,* 2006; Williams *et al.,* 2007). The result sends a confusing message to commissioners and health professionals, i.e. whether or not PARS involves effective use of resources for patients within primary care. The discrepancy may be due to different inclusion criteria of the reviews. Pavey *et al.* (2011) commented that previous reviews, although including RCTs, did not specifically review exercise referral schemes, whereby a member of primary care refers a patient to a third-party exercise provider. Consequently, conducting studies on PA interventions becomes challenging.

Health professionals offering AOR are encouraged to evaluate small-scale interventions to continue developing an evidence base (Young & Harries, 2001) and include provision for research studies to evaluate long-term effectiveness (Fox *et al.,* 1997); this is potentially detrimental to large-scale data collection and meta-analyses for effect size, as different methodological approaches are chosen to meet local needs (Department for Health, 2001). Quantitative, and more specifically random controlled trials (RCTs), are favoured in systematic

review criteria (Morgan, 2005; NICE, 2006e; Pavey *et al.,* 2011) as they provide objective data for medical outcomes. Hence, this approach was adopted for Study 1, 2, and 4. However, a qualitative approach can provide the lived experience of a participant and a different picture of effectiveness (Riddoch *et al.,* 1998). This approach is considered appropriate when aiming to better understand reasons behind non-attendance and non-adherence (Williams *et al.,* 2007). Therefore, this approach was adopted for Study 2. A local study conducted in 1996 in Northamptonshire concluded that the group receiving brief negotiation, where the participant was involved in decision making, had PA levels that were 10% higher than the levels of the direct advice group (Hillsdon *et al.,* 2002). Direct advice was given to one group and the other group received a brief version of Motivational Interviewing (MI). However, the specific details of treatment, i.e. MI training and competence of delivery, were not reported and hence the quality and practical differences between intervention treatments are unknown.

2.3.7 Gaps in knowledge in the literature on PARS.

It is unknown if the Northamptonshire AOR PA intervention has the high drop-out rate similar to other studies (Fox *et al.,* 1997; Gidlow *et al.,* 2005). PA levels are reported to increase in the short term for PARS (Williams *et al.,* 2007), with a limited number of statistically significant results for PA level increase in the long term (over 12 months; Pavey *et al.* 2011). In addition, the results of different studies on the effectiveness of PARS are conflicting (NICE, 2006e; Williams *et al.,* 2007). The NHS commissioners wanted to know if the AOR in Northamptonshire increased PA levels in the long term (i.e., 12 months).

Therefore, this study aimed to investigate both the adherence to AOR in Northamptonshire and the PA levels in the long term.

2.4 AOR Northamptonshire

The AOR in Northamptonshire aimed to commission equitable access to a wider range of leisure providers for the registered population of Northamptonshire. The primary recruitment approach was to target adults who led a sedentary lifestyle, had specified health risk factors and/or specific medical conditions, and would gain the most health benefits by being more physically active. The referral programme aimed to equip service users with the knowledge and confidence to become regular, independent exercisers. It also intended to contribute to improving health whilst reducing health inequalities in local communities (Northamptonshire PCT, 2008).

2.4.1 AOR Northamptonshire protocol.

The protocol was revised in 2008 to include all commissioned leisure providers across Northamptonshire. The protocol specified that the health professional that refers patients is to assess if change is desired by the potential participant (Appendix B.1). The following were the reasons for referral: overweight/obesity (BMI >25), asthma – pulmonary (lung related), diabetes (Type I/Type II), impaired strength or mobility, moderate cholesterol, moderate hypertension (>160/100 mmHg), neurological (Parkinson's/multiple sclerosis), smoker attempting to quit, back pain (not acute), stable angina (controlled & stable for six months), and mild depression/anxiety/stress (Northamptonshire PCT, 2008).

Once a patient is referred by the health professional, he/she is invited to an induction conducted by a trained fitness professional at a local leisure centre (Appendix B.1). Fitness professionals who work with referrals are to be GP referral trained, in addition to their NVQ Level 2 fitness qualifications, so that they are able to develop tailor-made PA programmes to meet the health needs of their clients. After the induction, if appropriate, the client is to attend the leisure facility for 12 weeks (with a contribution to payment which varies across the county) up to a maximum of 35 sessions. At the end of 12 weeks, the client is invited to attend an exit meeting with the fitness professional.

This study was part of the national quality assurance framework (DH, 2001) and the AOR Northampton PCT commissioning business case; this study evaluated the effectiveness of the PA primary care intervention in changing PA behaviour of sedentary patients (Northamptonshire PCT, 2008). Hence, this research was a commissioned study and after consultations with Public Health, Northamptonshire, the key aims and objectives were established by the commissioners. Existing AOR data collection processes (i.e. age, sex, ethnicity, reason for referral) were supplemented with the International Physical Activity Questionnaire (IPAQ), which is a validated PA self-reporting questionnaire, used for measuring the key objectives in this study and in PA intervention studies (e.g. Bond *et al.*, 2006, Dinger *et al.*, 2007, & Araujo-Soares, 2009) and the knowledge, skills, and attitudes to PA, as recommended in the NICE (2006a) guidelines. Additionally, it is currently unknown how other factors (i.e. sex, age, leisure centre) influence PA behaviour change and hence these factors were also explored in Study 1.

2.5 Aim and Objectives

2.5.1 Aim of the study.

The aim of this study was to evaluate the adherence and PA level behaviour change of AOR participants between October 2009 and September 2010 in Northamptonshire.

2.5.2 Objectives.

- Assess adherence to AOR.
- Compare induction PA levels using IPAQ at 3 months, 6 months, and 12 months.
- Investigate whether there were differences in PA outcomes between sex, age, leisure centre, number of attendances, induction knowledge, skills, attitudes, and stage of change.

2.5.3 Hypotheses.

The null hypotheses of this study were:

H^o1: There will be no significant difference in PA levels (metabolic equivalent [MET] min/week) at induction for AOR participants between 3, 6, and 12 months.

H^o2: There will be no significant difference between the mean PA levels (MET min/week) for the independent variables: sex, age, leisure centre, number of attendances, induction knowledge, skills, attitudes, and stage of change.

An additional research question was proposed:

1. What is the adherence rate for participants from induction to three months?

2.6 Methods

2.6.1 Participants.

Individuals referred by health professionals to 14 leisure providers across Northamptonshire, from October 2009 to September 2010, for AOR were recruited to this study. All AOR participants were inducted to a leisure centre during this time and were invited to participate in the research study (N = 2228).

2.6.2 Data collection.

Prior to the main study, the AOR study questionnaire database was piloted at the leisure centres with previous AOR participants. This was done to receive general feedback regarding language, presentation, and time taken to complete (≈20 minutes), as fitness professionals have one hour to complete the induction process including the study questionnaires. Modifications were then made to the questionnaire, e.g. drop-down menu selections and colour-coding for different sections on the IT database were added, a hard copy of the questionnaire was presented for clarity, and an additional question requesting participant consent and the researcher's contact details were added. Additionally, visits were made to gain additional awareness and understanding of resources at the leisure centres, develop a relationship with AOR co-ordinators, and to offer specific up-skilling training on the AOR effectiveness questionnaire. After receiving feedback from the participants and leisure centre staff, the IT questionnaire template was prepared on an Excel spreadsheet and all leisure centre staff were trained centrally on the input criteria.

Data was collected at induction and 3, 6, and 12 months after AOR completion to measure the effectiveness of PA behaviour change in the short and long term (NICE, 2006a).

2.6.2.1 Induction and exit.

Data regarding participants' sex, age, ethnicity, and reason for referral were collected on the referral form completed by the health professional. The leisure providers collected induction and exit data via the AOR study database. Because different resources were available at the independent leisure centres, some preferred to input data directly onto an IT database in the presence of the participant, while others preferred to note the data on paper and the data were then centrally loaded on the database by a co-ordinator.

Hard copies of AOR referral forms, AOR induction/exit data, and attendance per participant data were emailed to the PCT quarterly by leisure providers (Quarter 3: October 2009–December 2009, Quarter 4: January 2010–March 2010, Quarter 1: April 2010–June 2010, Quarter 2: July 2010–September 2010 and October 2010–December 2010 and January 2011–March 2011 for exit data only).

The total number of inducted participants for the study was 2228 and 626 attended their exit interview at 12 weeks after induction with the leisure provider.

2.6.2.2 Six- and twelve-month follow-up.

Follow-up questionnaires (See Appendix B.2), at 6 and 12 months after exit, were sent to participants that had given their consent at their induction, except for October and November 2009 referrals that received their 6-month follow-up questionnaire at 8 months once the ethical approval for the study had been granted. Thank you letters (Appendix B.3) were sent to participants once the 6-month questionnaires were returned to acknowledge the time/information given and to encourage participation at 12 months. A total of 307 six-month follow-up questionnaires and 242 twelve-month questionnaires were received.

2.6.3 Measuring PA.

Self-reported measures of PA levels were collected to determine the effectiveness of the AOR scheme in this study. Using a comprehensive decision matrix from the Medical Research Council (2010), the total PA level was assessed to evaluate if it was in line with the CMO's recommendation. The intensity, duration, and type of PA were additional elements that were studied to better understand the behaviour change, if any, that had occurred. Importantly, in light of factors such as the high number of participants, relatively low budget, intention to have low participant burden, complexity of data analysis, and feasibility (i.e. suitable for elderly participants), self-reporting questionnaire was considered the favourable method for measuring PA levels.

There is a wide range of PA measuring tools and methods: self-reporting questions, activity log, pedometer, accelerometer, and heart rate monitors. Macfarlane *et al.* (2006) discussed the challenges arising because of differences in the cut-off points for different methods of measuring PA and the consequent

lack of convergent validity. Further details of PA measures can be found in Chapter 4, Section 4.1, 4.2 and 4.3 of this thesis. The validity and repeatability of self-reporting PA can be compared to objective measures such as heart rate (using heart rate monitors) and acceleration (using accelerometers) to enhance confidence levels of the outcomes of the more subjective methods (i.e. IPAQ; Craig *et al.,* 2003). The IPAQ, which has been reliability- and validity-tested in 12 countries (Spearman's ρ clustered around 0.8 and criterion validity mean ρ of 0.30), is a self-reporting questionnaire used to measure vigorous, moderate, and walking activity in the last seven days of the programme (Craig *et al.,* 2003). The IPAQ is recommended as a research tool for measuring PA levels (Craig *et al*., 2003). Hence, the IPAQ was adopted for Study 1. According to Bull (2005a), the IPAQ short form takes between 3 and 4 minutes to administer and the IPAQ long form, between 15 and 20 minutes (number of questions: N = 4 [short form] and N = 27 [long form], both self-administered).

Considering the fact that fitness professionals who were administer the questionnaire would not have prior knowledge of the IPAQ and one hour is the allocated consultation time for recording baseline measures and conducting the leisure centre induction programme, the IPAQ short form (Appendix B.4, 2001) was selected because it was considered both less daunting and a more practical option to include in the evaluation by the fitness professionals. It is possible to obtain a continuous measure of categorical indicators of PA from the IPAQ forms, e.g. Metabolic (MET) minutes/week is the continuous measure of energy yielded weighted by type of activity (Anon., 2005). The MET compendium (Ainsworth *et al.*, 2000) was referenced by the landmark report recommending at least 30 minutes/week of PA (Pate *et al.*, 1995) as a reference for moderate-intensity activities.

2.6.4 Measuring knowledge, skills, and attitudes.

Likert (1932) describes a technique of constructing a scale to measure attitudes; it is widely used in research surveys and can be modified to fit any purpose. Dawes (2008) found that 10-point scales had significantly low mean scores, so for both the practicality of offering the range of answers to participants when reading the questions and to obtain appropriate mean scores, the 5-point Likert scales were used for this study to measure knowledge, skills, and attitudes. The NICE (2006a) guidelines for AOR do not specify what question should be asked to measure knowledge, skills, and attitudes; even the literature on PA does not detail a gold standard approach. The researcher consulted with DH regarding the specifics to be included in the study but did not receive any direct response, so the rationale behind the questions regarding knowledge, skills, and attitudes is presented below.

2.6.4.1 Knowledge.

A study in 2007 reported that 27% of the men and 29% of the women thought they knew the recommended amount of PA for health benefits. However, fewer than 1 in 10 adults gave the correct response (National Health Service, 2007). Therefore, the question asked to the AOR participants at baseline, exit, and 6 and 12 months after intervention was:

What is the level of moderate physical activity per week recommended by the Chief Medical Officer? (Moderate physical effort so that you breathe somewhat harder than normal)

(5 × 30 min/5 × 60 min/3 × 30 min/7 × 120 min/Don’t know)

CMO recommendations have been revised during the timeframe of the research to 150 minutes of moderate PA per week (DH, 2011). This was not changed in the follow-up questionnaires in order to maintain study integrity.

2.6.4.2 Skills.

Bandura (1989) suggested that determining the skills that facilitate behaviour change requires interactions between personal, behavioural, and environmental factors. Self-regulation is associated with exercise behaviour, and time management is one of the suggested skills to be developed to overcome situational and personal barriers to initiating and maintaining PA schemes (Hallam & Petosa, 2004; Hellsten & Rogers, 2009). With this awareness, participants' time management skill was assessed by asking the following question:

I can manage my time to be able to do physical activity (0 = Strongly Disagree; 4 = Strongly Agree).

Bandura (1977) stated that the best measure of behaviour is behaviour itself rather than complex questioning. Maurer and Pierce (1997) consider a Likert scale an acceptable method to measure self-efficacy. Lack of leisure time and/or too much work have been identified as main barriers to undertaking PA (National Health Service, 2007); the following statement was created to capture a snapshot of self-reported self-efficacy:

When my life is busy, I am confident in my own ability to exercise... (0 = Strongly Disagree; 4 = Strongly Agree)

2.6.4.3 Attitudes.

Enjoyment of PA has been identified as a determining factor for adoption of PA (Ajzen, 2001; Salmon *et al.,* 2003) and was more significant than the chosen mode of activity itself (Miller *et al.,* 2005). Although enjoyment is not easily defined or measured, it could be considered when offering options of physical activities (Wankel, 1993). After substantially discussing about the diversity of definition regarding attitudes to PA, Biddle and Mutrie (2008) detailed the three component views of attitudes applied to PA – affect, cognition, and behaviour – noting that attitude is usually about feelings. A Likert scale is used in the self-reporting questionnaires, to measure attitudes:

Physical activity makes me feel good (0 = Strongly disagree; 4 = Strongly agree) Physical activity is... (0 = Bad for me; 4 = Good for me).

2.6.4.4 Stage of change.

In addition to measuring knowledge, skills, and attitudes, given the existence of behaviour change models (e.g., self-determination; Ryan & Deci, 2000 and stages of change; Prochaska *et al.,* 1992) and theoretical concepts such as self-efficacy (Bandura, 1977), PA intention may have an impact upon the effectiveness of AOR. Marcus *et al.* (1992) concluded that a single question can be used to determine the stage of change in intervention designs, where the focus is on the stage of changes with TTM, as often used in other PA interventions (Hutchinson *et al*., 2009). In this study, the data regarding the stages of behaviour change (Prochaska *et al.,* 1992) were used as the foundation to construct the question for assessing the PA stage of behaviour of the participants and identifying the PA intention of referred patients (Marcus &

Owen, 1992; Biddle & Mutrie, 2008). The questionnaire developed by Prochaska and Marcus (1994) was used to assess the individuals' PA stage of change in a PA intervention (Lorentzen, 2007).

The statements offered to participants were:

1. I am not physically active and do not intend to perform physical activity in the next six months (Precontemplative)
2. I am not currently physically active but intend to become more physically active in the next six months (Contemplative)
3. I am currently physically active but not regularly (Preparation)
4. I have been engaging in regular physical activity for less than six months (Action)
5. I have been regularly physically active for the last six months (Maintenance)

2.6.5 Data collation.

All GP referral forms were copied and sent to the PCT by the leisure providers. The referral form data which included participant personal details was matched to the leisure centre returns according to the participant code and consolidated onto a master AOR datasheet. Owing to missing data and/or inaccurate data sorting via the current AOR software, the information was inputted manually into a master database which was encrypted and secured by password for data protection. As the data were collated, they were colour coded to monitor when participants had requested no further contact and when follow-up questions had been sent and received. Duplicated data and data without an induction date were removed from the master database (n = 144).

2.6.6 Statistical analysis.

Descriptive and inferential statistics were used to analyse the data. Mean values were reported with standard deviation, unless specified as standard error (SE). Responses to the IPAQ PA questionnaires were converted into PA categories: low, moderate, high and the IPAQ MET minutes/week values were calculated as detailed in Chapter 4 (Section 4.5.4.1). MET minutes/week median average values at induction and 3, 6, and 12 months were reported as per the IPAQ scoring guidelines (Anon., 2005). Age and attendance data were categorised. All data were coded and transferred into SPSS (Version 17.0) for statistical analysis. Throughout the study, alpha (α) was set at 0.05 for 95% confidence. Initially, a repeated-measures ANOVA was conducted on the IPAQ MET minutes/week data obtained at induction and 3, 6, and 12 months to check for statistical significance. However, after SPSS data cleansing, only 49 lines of data were included in the SPSS output and so paired sample *t*-tests were performed to explore the difference in IPAQ mean values using transform function, between induction to 3 months, induction to 6 months, and induction to 12 months to test for statistical significance. A Bonferroni correction was applied to α in this instance (0.05/6 = 0.0083).

The differences across time periods in knowledge, skills, attitudes, and stage of change were calculated using SPSS. To test for significant differences in PA levels (MET minutes/week) across the factors (e.g. age, sex, and ethnicity), a factorial (univariate) ANOVA with ten factors and Bonferroni post-hoc analysis was used. The 10 factors were as follows: age, sex, leisure provider, number of attendances, induction knowledge, skills (2), attitudes (2), and stage of change. This study was designed to meet the needs of the commissioners from Public Health, Northamptonshire, as detailed in Section 2.4.1.

2.7 Results

2.7.1 Number of referrals and attendance.

The total number of participants inducted from October 2009 to September 2010 was 2228 (Figure 2.3). The mean average attendance (n = 1884) was 11.62 +/- 11.86 sessions; 344 participants did not have a record of attendance. From those with a recorded attendance, 110 participants completed the maximum 36 sessions; 80 sessions were conducted at leisure provider J and 24, at leisure provider L; 626 (28%) of the inducted participants attended their exit appointment at 3 months; 307 (21%) completed the 6-month questionnaires sent to them, and 242 (17%) completed the questionnaires sent at 12 months.

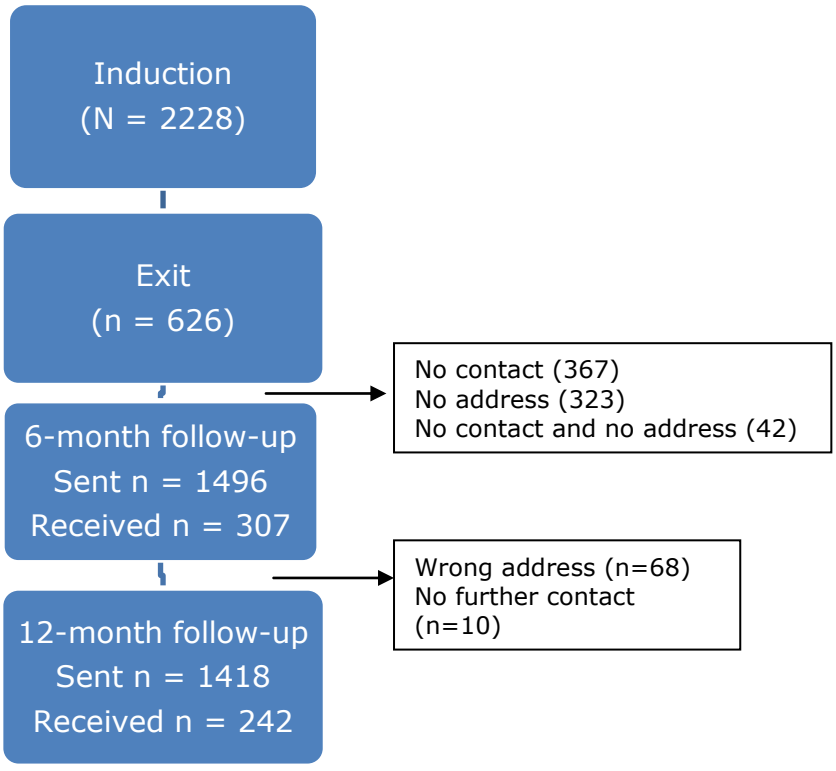


Figure 2.3. Response rate or participants throughout the study.

2.7.2 Sex and age.

With regard to sex distribution, 731 (33%) participants were male and 1192 (54%) were female.

The mean age of the participants (N = 2228) was 45.63 +/-14.93 years (Table 2.1); 4% (n = 68) of the participants were aged <16 years or ≥74 years.

Table 2.1

Age ranges of AOR participants

	Under 16 yr	16–34 yr	35–54 yr	55–73 yr	≥74 yr	Missing
Frequency	12	444	859	494	56	363
%	0.5	20	39	22	2.5	16

2.7.3 Ethnicity.

From the total number of inducted participants, 411 (18%) were White British and the ethnicity of 1545 (69%) participants was unknown; 683 participants specified an ethnic category (Figure 2.4); 90% (n = 613) belonged to the ethnic categories of White British/English, Other White, or British/English.

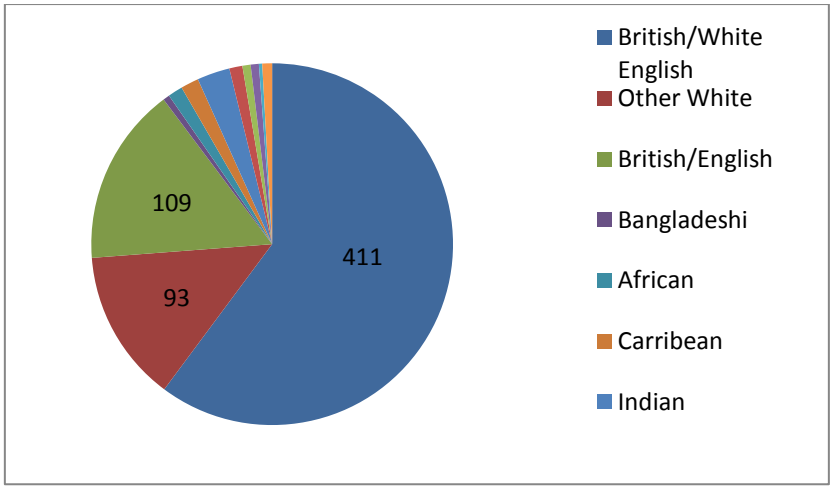


Figure 2.4. Known ethnic categories of participants inducted into the study (n = 683).

2.7.4 Reason for referral.

The top three reasons for referral were, obesity (n = 1147), depression (n = 647), and mobility (n = 333) (Figure 2.5).

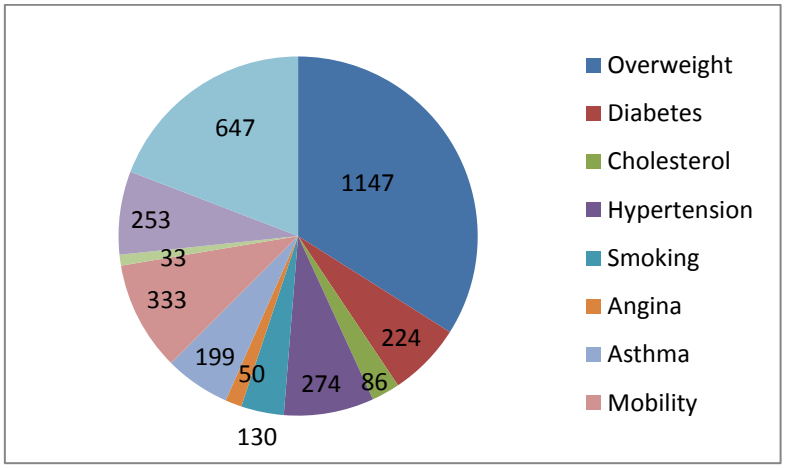


Figure 2.5. Reason for referral for all participants at induction.

A total of 966 participants were referred for multiple reasons with 172 combinations of reason for referral (i.e. overweight with diabetes and impaired mobility). The most frequent multiple reason was overweight with depression (n = 135).

2.7.5 Leisure provider.

Table 2.2 shows the distribution of referrals (N = 2228) for the 14 leisure providers across the county. Leisure providers G, H, and M each inducted over 10% of the total referrals between October 2009 and September 2010. Leisure provider I received less than 1% of the county AOR referral participants.

Table 2.2

Frequency of induction per leisure provider

	Leisure Provider													
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**
Frequency	163	182	35	89	213	216	298	237	19	98	59	148	289	182
%	7.3	8.2	1.6	4	9.6	9.7	13.4	10.6	0.9	4.4	2.6	6.6	12.9	8.2

2.7.6 Self-reported PA level.

The IPAQ median MET minutes/week values are reported for induction and 3, 6, and 12 months (Table 2.3). At induction, 1812 participants self-reported a

median PA level of 924 +/- 2257.01 MET minutes/week. At 3 months, 521 participants self-reported a median PA of 1739.00 +/-2728.39 MET minutes/week. From 234 six-month returns, the median PA level was found to have increased to 2188.25 +/-3064.00 MET minutes/week, and at 12 months; 193 self-reported a median increase of 1746.00 +/-2663.63 MET minutes/week. The standard deviation across all time periods indicates that some participants reduced their PA level during the time intervals of the study.

Table 2.3

Total available IPAQ median MET minutes/week values

	Months			
	0	**3**	**6**	**12**
Number of participants	1812	521	234	193
Median* MET minutes/week	924.00	1739.00	2188.25	1746.00

*Median value reported as recommended in IPAQ scoring guide (Anon., 2005)

The frequency of IPAQ self-reported categorical PA levels at induction and 3, 6, and 12 months are shown in Table 2.4. Further details about the IPA categories can be found in section 4.5.4.1 in this thesis.

Table 2.4

IPAQ self-reported PA categories

	Time Period			
PA Category	**Induction**	**Exit**	**6 months**	**12 months**
Low	836	127	58	48
Moderate	650	179	74	70
High	326	214	103	74

The percentage of low category for those that completed the IPAQ questionnaire was reduced from 46% (n = 836) at induction to 25% (n = 48) at 12 months. There was also a 20% increase in those self-reporting high PA levels. The percentage of those reporting moderate PA levels remained around 36%, at induction and 12 months.

2.7.7 Knowledge, skills, and attitudes.

2.7.7.1 Knowledge.

The knowledge question of how much PA is recommended by CMO was correctly answered by 42% (n = 2121) of the inducted participants. Additionally, 59% of those attending the exit appointment at 3 months correctly answered the knowledge question. Hence, participants' knowledge of the CMO-recommended amount of moderate PA had improved in the short term.

2.7.7.2 Attitudes and skills.

Participants self-reported attitudes, skills, and self-efficacy from induction to 3 months, induction to over 6 months, and induction to over 12 months had a mean difference of less than 1 throughout (Table 2.5).

Table 2.5

Mean difference for skills and attitudes

Skills and Attitude	Difference in Time	N	Mean Difference	SD
I can manage my time to be able to perform physical activity	Induction to 3 months	603	0.09	1.11
	Induction to 6 months	295	-0.45	1.19
	Induction to 12 months	232	-0.41	1.29
When my life is busy, I am confident in my own ability to exercise	Induction to 3 months	601	0.12	1.20
	Induction to 6 months	290	-0.49	1.29
	Induction to 12 months	231	-0.32	1.35
Physical activity makes me feel good	Induction to 3 months	603	0.35	0.97
	Induction to 6 months	295	-0.03	0.99
	Induction to 12 months	234	0.00	1.05
Physical activity is...	Induction to 3 months	596	0.02	0.78
	Induction to 6 months	293	-0.19	1.01
	Induction to 12 months	232	-0.21	0.92

2.7.7.3 Stage of Change.

A total of 1226 (55%) of participants at induction said they were not currently physically active but intended to become more active in the next 6 months. A further 37 (2%) did not intend to increase their PA levels at induction and 158 (7%) had been physically active for more than 6 months. The self-reported mean difference PA Stage of Change increased at 3, 6 and 12 months when compared to initial responses at the induction (Table 2.6). Hence, participants increased their intention to be physically active at 3 months, 6 and 12 months when compared to induction.

Table 2.6

Tracked mean difference for PA Stage of Change from induction to 3, 6, and 12 months

PA Stage of Change	Frequency	Mean difference	+/-
Induction to 3 months	602	1.17	1.10
Induction to over 6 months	287	0.86	1.38
Induction to over 12 months	228	0.93	1.40

2.7.8 Inferential results.

The *t*-tests results for the IPAQ MET minutes/week values at 3, 6, and 12 months and at induction showed statistically significant difference ($p < 0.001$). Table 2.7 shows the statistically significant difference in PA IPAQ MET minutes/week values between induction to 3 months, induction to 6 months, and induction to 12 months ($p < 0.001$).

Table 2.7

t value and *p* value for IPAQ MET minutes/week values

IPAQ MET minutes/week values	***t***	***P***
Induction to 3 months (n = 446)	7.51	0.001
Induction to 6 months (n = 201)	6.17	0.001
Induction to 12 months (n = 163)	5.00	0.001

From induction to 3 months, the mean increase in MET minutes/week for 446 participants was 1011.69 +/- 2845.21 MET minutes/week. From induction to over 6 months, the mean increase in MET minutes/week for 201 participants was 1251.03 +/- 2876.63 MET minutes/week. From induction to over 12 months, the mean increase in MET minutes/week for 163 participants was 1102.80 +/- 2816.97 MET minutes/week (Figure 2.6).

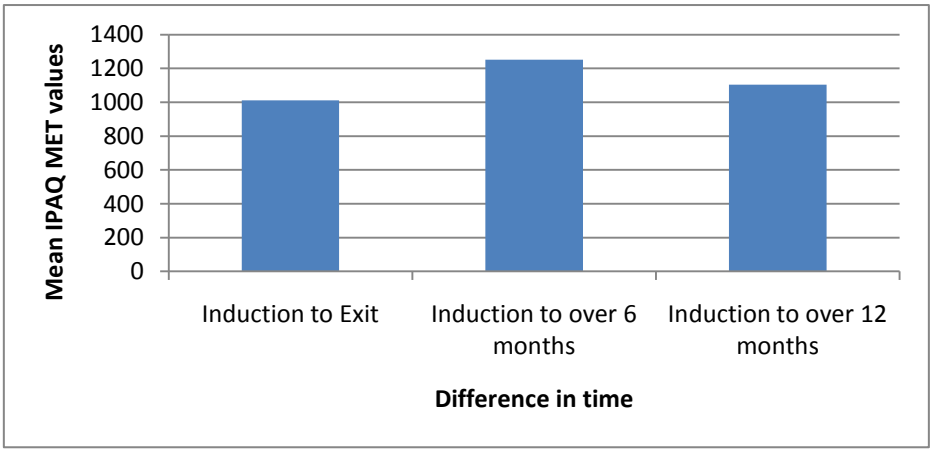


Figure 2.6. Mean IPAQ MET minutes/week values at the different time periods of induction to 3, 6, and 12 months.

Overall, 310 out of the 446 participants (induction to 3 months) increased their PA level while 137 out of the 201 participants (induction to 6 months) increased their PA level. In addition, 105 out of the 163 participants (induction to 12 months) increased their PA levels.

2.7.8.1 Differences in independent variables over time.

The difference in PA, as measured by IPAQ MET minutes/week values, from induction to 3 months was analysed by performing a univariate ANOVA with 10 factors (Table 2.8). There was a statistical significance ($p < 0.05$) for sex (Figure 2.7), attendance category (Figure 2.8), and PA stage of change (Figure 2.9).

Table 2.8

Results from ANOVA induction to exit

Independent Variables	***DF***	***F***	***P***
Leisure Provider	10	2.555	.060
Sex	1	5.095	.025*
Age category	4	2.617	.350
Attendance category	3	4.734	.003*
What is the level of moderate physical activity per week recommended by the Chief Medical Officer?	4	1.643	.163
I can manage my time to be able to do physical activity	4	1.957	.101
Physical activity makes me feel good	4	1.059	.377
Physical activity is...	3	.531	.661
When my life is busy, I am confident in my own ability to exercise	4	1.524	.195
PA Stage of Change	4	4.178	.003*

*significance $p < 0.05$

There was a significant difference in PA levels between males and females from induction to 3 months ($F(1,326) = 5.10$; $p < 0.01$). Mean PA MET minutes/week from induction to 3 months was higher for males (1891.83 MET minutes/week SE 908.68) than for females (1196.29 MET minutes/week SE 901.25), as seen in Figure 2.7.

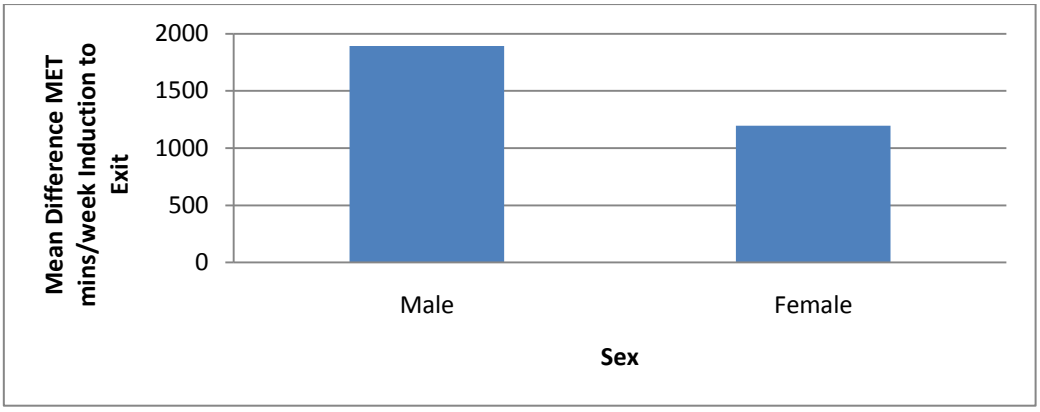


Figure 2.7. Mean MET minutes/week for males and females from induction to 3 months (n = 368).

There was a significant difference in MET minutes/week values between attendance category ($F(3,326) = 4.73$; $p < 0.05$). Bonferroni post hoc test results showed that compared to participants that attended 5 to 18 sessions, those that attended more than 36 sessions significantly increased their PA levels with a mean increase of 2281.24 MET minutes/week (SE, 606.79; $p < 0.05$), and compared to those that attended 19 to 36 sessions, those that attended more than 36 sessions increased their PA levels with a mean increase of 2101.91 MET minutes/week (SE, 602.14; $p < 0.05$) (Figure 2.8).

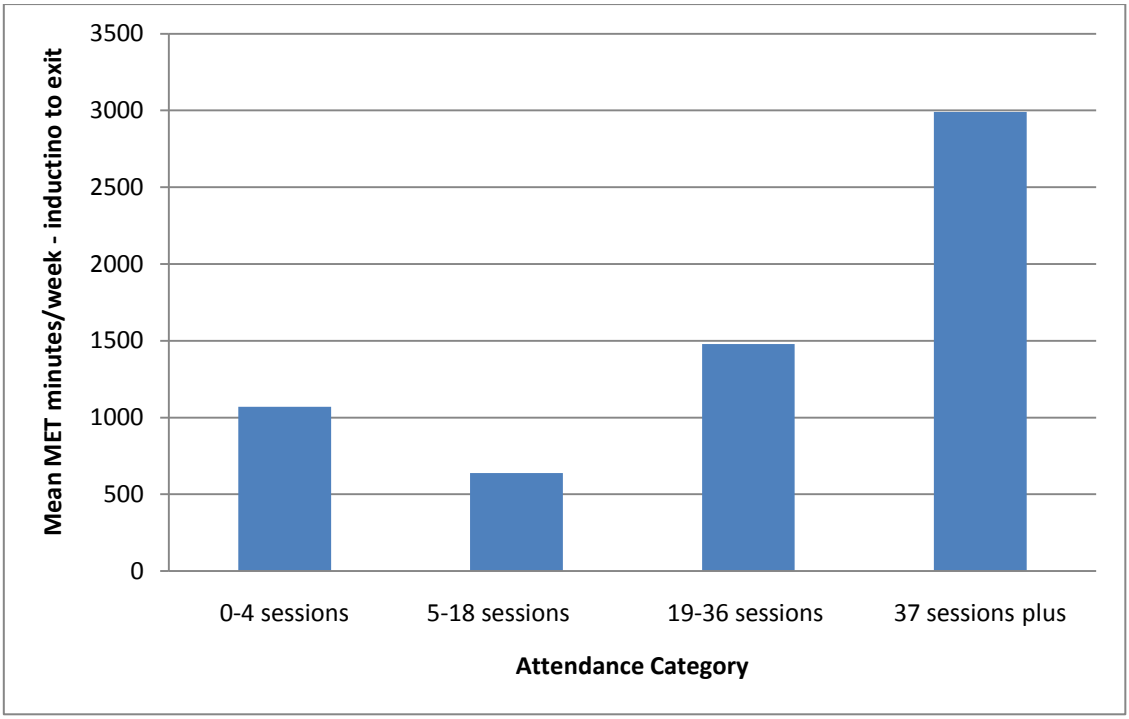


Figure 2.8. Number of attendances and mean difference in IPAQ PA MET minutes/week values (n = 368).

There was a significant difference in MET minutes/week values between the self-reported stages of change from induction to 3 months, ($F(4,326) = 4.18$; $p < 0.05$). The Bonferroni post hoc test results showed that participants intending to do more physical activity, categorised as contemplative, significantly increased their PA levels with a mean increase of 1706.92 MET minutes/week (SE, 487.18; $p < 0.05$) compared to those who had been regularly physically active for the past 6 months (Figure 2.9).

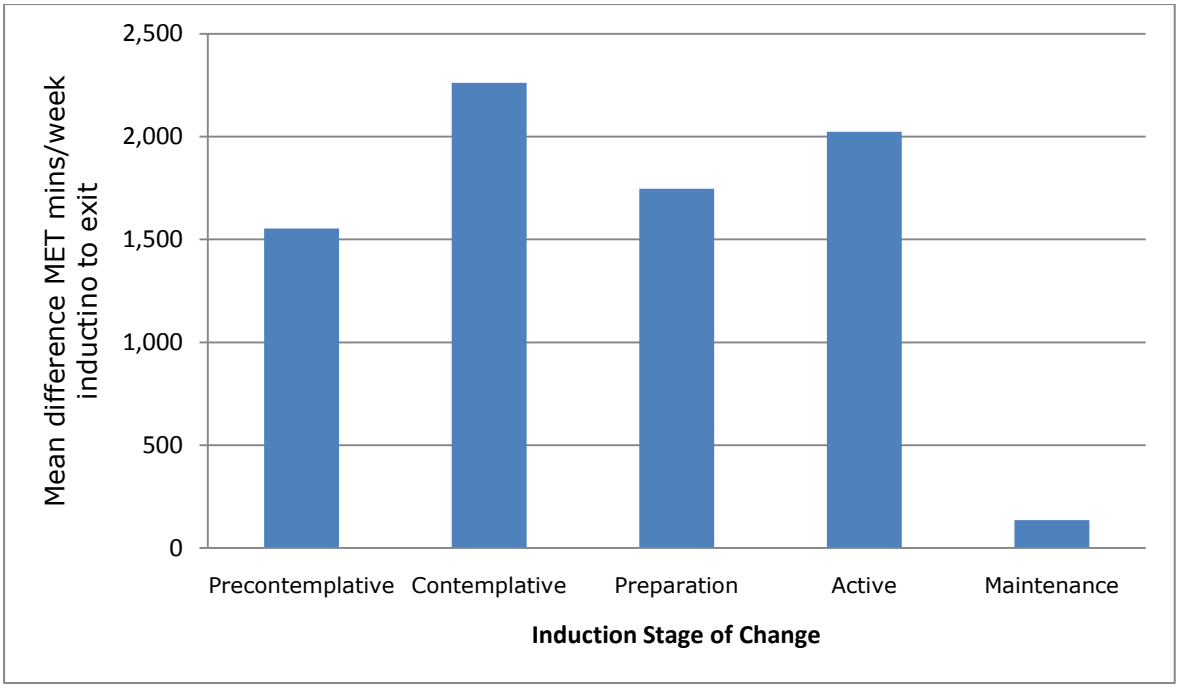


Figure 2.9. PA stage of change at induction and mean IPAQ PA MET minutes/week (n = 368) from induction to 3 months.

2.8 Discussion

This study was conducted as recommended by NICE (2006a) to only commission AOR as part of a research study for assessing the effectiveness of PA behaviour change. AOR is one of the four recommended PA interventions in primary care (NICE, 2006a) that aims to support sedentary individuals with specific referral conditions become more physically active (Northamptonshire PCT, 2008). Attendance of participants at their exit interview in this study suggests a comparatively high (Murphy *et al.,* 2010) drop-out rate of 72% at 3 months, supporting the concern of low adherence to PARS (Lord & Green, 1995, Gidlow *et al.,* 2005) and impact at population level (Fox *et al.,* 1997). Additionally, the reported number of sessions attended during the intervention (Section 2.7.1)

was half that expected in the PARS business case in Northamptonshire (Northamptonshire PCT, 2008). These results fuelled Study 2. Non-adherence may be due to lack of self-determination (Morton *et al.,* 2008), but the theoretical tenets of SDT were not measured in this study. The results (Figure 2.8) show that individuals, who attended more sessions, self-reported a higher PA mean increase. It is known that those that attend and adhere to PARS experience improvements in their health (Taylor *et al.,* 1998; Morgan, 2005; Williams *et al.,* 2007). Hence, finding ways to increase adherence may enhance the impact of PA behaviour change during AOR in Northamptonshire.

Among those who attended and/or completed follow-up questionnaires, PA levels did significantly increase in the short and long term and hence the null hypothesis for the study is rejected, whereby 310 individuals self-reported increased PA in the first 3 months, 137, after 6 months, and 105, after 12 months (Section 2.7.6). The mean increase of PA levels at 12 months was lower than that self-reported at 6 months (Section 2.7.6) and may be understood in terms of the natural relapse within the TTM (Section 1.6.2), meaning individuals increase PA levels initially, but over the long term, experience a reduction in PA levels, whilst remaining at a higher level than the self-reported PA level at induction. Another consideration when measuring with self-reported PA levels was the potential of over-reporting when using self-reporting IPAQ questionnaires (Rzewnicki *et al.,* 2003). This discrepancy was addressed by using a within-participant repeated-measures design; if the participant over reported at induction and at exit, when calculating the difference, if the over-reporting was to the same magnitude, it would be cancelled out. An overall approximate mean average increase of 1000 MET minutes/week, is approximately equivalent to an increase of two hours of vigorous or four hours

of moderate-intensity PA or five hours of walking. The increase in PA levels in this study was much higher than 21 minutes/week reported in a previous study (Dugdill *et al.,* 2005), probably because of the use of different outcome measures (i.e. Godin leisure time score). The increase in PA was similar to the 4 hours increase in walking, as reported by Scales (1998). This is also a meaningful result showing that AOR participants self-reported PA increases during and after the PA intervention. However, the causal effect (Hernan, 2004) of the PA level increase due to AOR cannot be claimed, as this study was not a controlled trial. Hence, other factors may have contributed to the reported long-term MET minutes/week value increase in physical activity (e.g. weather, finances, enhanced physical/mental health). The PA behaviour change was maintained in the long term for this study, thereby refuting the claims of only short-term PA behaviour change for PARS (Harland *et al.,* 1999; Harrison *et al.,* 2005; Morgan, 2005; Pavey *et al.,* 2011) and supporting the finding of Cochrane and Davey (2008) and of the meta-analysis by Williams *et al.* (2007) of potential long-term PA increase. Although the PA level increase is commendable, akin to other PA studies, ultimately, the impact of this increase on the individuals' health is unknown (Pavey *et al.,* 2011). Additionally, this present study demonstrates that some participants may decrease their PA levels having been inducted into AOR although the study is unable to explain why this occurs (e.g. illness, pain, weather).

Similar to the findings of Gidlow (2005), more females than males were found to engage in the AOR intervention in Northamptonshire (Section 2.7.2); however, the actual numbers and corresponding factors of individuals that were referred by health professionals across Northamptonshire are unknown, as the initial data collection point for participants inducted by the fitness professional was the

leisure centre. In addition, this study did not take into account patients that may have been eligible but not referred by health professionals (Darzi, 2008). The average age reported was similar to that reported in other PARS studies (Pavey *et al.*, 2011), though 68 referred participants were outside of the AOR protocol age range (Section 2.7.2) which is a matter of concern in the screening process.

Dugdill *et al.* (2005) suggested that those with more severe conditions are more likely to engage in PA and Crone *et al.* (2008) raised concerns regarding the lower rate of engagement of those referred for mental disorders than of those referred for physical disorders. The referral figures reported (Section 2.7.4) indicate that the second-most important reason for referral to PA intervention in Northamptonshire is mental disorders, and this supports the increase in national referral figures reported by the Mental Health Foundation (2009). The claim that obesity was the foremost reason for referral (Section 2.7.4) warrants further investigation of GP/Health professionals' understanding and perceptions of the AOR intervention for their patients. Additionally, this PARS evaluation (DH, 2001) may enable further discussion so that best practice could be shared across Northamptonshire, as some leisure centres reported higher participant attendance rates than others (Section 2.7.5). Thus, the countywide PARS in Northamptonshire had variance, as did the recent Welsh ERS (Murphy, *et al.,* 2010), despite PARS being systematic interventions (DH, 2001).

The knowledge measured in this study increased for some individuals during the intervention (Section 2.7.7.1). However, during the timeframe of this study, the CMO's recommended PA level has been revised, so the impact of this revision also warrants further investigation. The lack of differences reported in attitudes does not support Thurston and Greens' (2004) perspective that enjoyment and

relatedness are as important as PA increase for PARS, but it should be noted that the self-reporting questions may not been sensitive enough to capture changes in attitudes. Participant interviews may capture lived experience, potentially collecting data around attitude shifts during the intervention, so the lack of enhanced self-reported enjoyment from induction to three months may have contributed to lower adherence/attendance because of absence of social interaction (Hardcastle & Taylor, 2001). Of note, the lack of meaningful change in skills and attitudes reported in this study may be due to the single statement questions. Dedicated studies in these areas may help develop more depth to understand the impact of PA interventions with these variables. Outcomes measures recommended in the NICE (2006a) guidelines (i.e. knowledge, skills, and attitudes) were vague and even after direct conversations with the DH, measures were not specified. Hence, governing bodies are encouraged to not only specify the variables are to be measured but also ensure consistency across the UK, i.e. specific details of what is to be measured should be included in future policy documents. Alternatively, in terms of measuring PARS effectiveness, levels of autonomy and behavioural motivation could be measured via questionnaires such as the Behavioural Regulation in Exercise Questionnaire-2 (Markland & Tolbin, 2004) to assess the Relative Autonomy Index (RAI) during the PA interventions.

Participants that intended to make the behaviour change at induction self-reported a significant PA MET minutes/week increase in the short term. Across all initial self-reported stages of change, there was a mean increase over three months (Figure 2.9), noting that the highest difference in PA levels was recorded for individuals that were contemplating becoming more active and the least PA increase, for those that had already been active during the last six months.

These results support the notion of investing in individuals that are ready to change (DH, 2001).

The Northamptonshire Scheme did include elements of the quality assurance framework (Department for Health, 2001), but it is unknown to what extent the health risk of the individual was considered if the individual was ready to change at the point of referral (DH, 2009a) and/or if a collaborative communication style was used at the point of referral (Campbell *et al.,* 1985; Graham *et al.,* 2003). Additionally, with the referral to the leisure centre as the only option during AOR, the intervention in Northamptonshire may be considered an individual process (DH, 2001) as other physical activities may have been more engaging (Wormald & Ingle, 2004).

The PARS guidelines suggest that readiness for change should be assessed (Department for Health, 2001) and this study highlights the impact on PA change occurring when patients intend to change their behaviour whilst highlighting that the screening process could be improved; 55% of the participants self-reported being in the contemplation stage of behaviour change, 2% were pre-contemplating and not intending to become active, and 7% self-reported to be engaged in PA, hence already in action (Section 2.7.7.3). Effective selection of individuals referred to AOR is important for effective use of resources (Riddoch *et al.,* 1998), as shown in Table 2.4; 326 participants self-reported their PA levels at induction as a high category and thus not physically inactive, hence being ineligible for referral to AOR.

An additional consideration of the AOR evaluation is that participant ethnicity data is not comparable to local demographic statistics for this study owing to the level of unknown data (Section 2.7.3) included because of commissioning

requirements for equality and inclusion, so individuals collecting evaluation data are encouraged to ask the individuals their ethnicity. This would also support the recommendation by Biddle and Mutrie (2008, p.8) to focus on "hard to reach" black and ethnic minority populations.

Although this study is not a cost effectiveness study, a comparative financial investment in the Northamptonshire AOR indicates the level of investment compared to other interventions across the UK. The financial investment is calculated by dividing the investment for management fee for leisure providers, total number inducted, and cost of average number of sessions multiplied by number of participants that increased their PA level. In the short term, the unit cost for an increase in PA was £684 if 310 participants self-reported an increase in their PA levels at 3 months and with an average attendance of 11 sessions from 2228 participants. This is equivalent to the estimated costs for other PARS (Stevens *et al.,* 1998; Murphy *et al.,* 2010). The PA level increase/decrease of those that did not adhere is unknown and this may alter the cost effectiveness calculation.

Considering the financial investment for the PA intervention, the 2-month long-term self-reported PA levels increased for only 105 participants from the total sample of 2228, meaning 5% of the inducted participants increased their PA in the long term which is a more modest ratio than that reported by Williams *et al.* (2007). This study has shown that PA levels have increased for some AOR participants in Northamptonshire, but causal relationships have not been measured in this study. The key message for commissioners following this study is that the impact of AOR in Northamptonshire from October 2009 to September 2012 was that 1 in 21 participants inducted into AOR in this study, self-reported

long-term PA behaviour change, and focus on enhancing adherence may enable better use of invested resources.

2.8.1 Application to theory.

This was an inductive study and PARS, although recommended to be practical rather than a theoretical approach (DH, 2001), may be advanced in terms of adherence, considering the tenets of TTM and SDT (Williams *et al.,* 2007). From the results of the PARS study in Northamptonshire discussed above, the increase in PA behaviour indicates that an individual moves through stages (Prochaska *et al.,* 1992), from contemplating, preparing, if given the opportunity, to auctioning the change. Hence, they may be contemplating the change at induction and not yet ready for action. The reduction of averaged MET minutes/week from 6 months to 12 months is an indicator of behaviour change relapse, identified in the spiral of change (Figure 1.3) where additional support is required to develop the individual's self efficacy, as recently reported in the Welsh ERS (Murphy *et al.,* 2010).

More than a decade ago, the evidences for PARS were considered thin, in comparison to the thick guidelines (Young & Harries, 2001), and readiness to change (Prochaska, 1992) and potential resistance to change (Rollnick *et al.,* 1992) during premature interventions seemed to influence uptake of physical activity. The process of referring an individual to a leisure centre is an example of external (non-self-determined) motivation. The extent of externalised motivation (i.e. regulated, introjected, identified, integrated) is unknown for this study and may have been varied across the county, determined by different health/fitness professionals' behaviour and the extent of the autonomy support.

Self-determined exercise motivation is posited to lead to positive outcomes, such as increased PA levels (Ryan & Deci, 2000).

Considering the theoretical frameworks discussed in Chapter 1, this study raises questions about the interaction between the patient and health/fitness professional, where information such as decisional balance, self-efficacy, and preferred type of PA could be elicited. Pragmatically, this interaction calls for an egalitarian communication between the health/fitness professional and patient (Stewart, 1995). PA intervention studies may also test variables for each specific reason for referral (e.g. diabetes; Fortier *et al.,* 2012), whilst continuing to explore the impact of autonomy, relatedness, and competency (Deci & Ryan, 1985).

Even though RCTs are considered the gold standard for scientific studies (Pavey *et al.,* 2011) and enable a causal relationship to be tested, they are not always the most effective means to engage individuals (DH, 2001), considering both the long-term engagement in research and PA behaviour change (NICE, 2006a). The 72% dropout rate and attendance for only half of the sessions available, raises concerns regarding how to effectively support individuals referred to AOR to engage in the intervention. As detailed in Section 2.3.3 and Section 2.3.5, social inclusion (Hardcastle & Taylor, 2001) and health professional involvement (McKenna *et al.,* 1998) are thought to be contributing factors to enhance engagement. However, non-adhering participants are often classified as missing data in PARS studies because researchers select studies that use quantitative methods for their meta-analysis (Pavey *et al.,* 2011). Study 2 aimed to address this concern and explore reasons behind non-engagement in the PA intervention, to understand why individuals do not adhere to PA interventions.

2.8.2 Study limitations.

Missing data, either because of non-adherence to the intervention and/or to non-completion of study questionnaires, is a limitation of this study, requiring a research team to follow-up via phone calls and resending of requests for completion. This helps enhance the confidence that the results were true and applicable to future PA interventions. The researcher successfully encouraged questionnaire return for this study (Section 2.7.1; 4% loss from 6 to 12 months on the follow up questionnaire), suggesting a positive engagement of the participants in the research. Hence, sending a thank you letter acknowledging the participants response may have encouraged a reply at 12 months. One reason behind dropping out may have been mortality after intervention, as seen in the case of one participant. The total number of mortalities for study participants remains unknown.

Chapter 3 Lived Experiences of Non-Adhering AOR Participants: An Interpretative Phenomenological Analysis (Study 2).

3.1 Introduction

It is not clear whether AOR schemes effectively use resources (Pavey *et al.,* 2011). Hence, strategies to increase attendance (Lord & Green, 1995; Gidlow *et al.,* 2005) and long-term adherence are required (Morgan, 2005). The Allied Dunbar National Fitness Survey (ADNFS; Sports Council and Health Education Authority, 1992) asked participants what stopped them from exercising and provided the following response options: physical, emotional, motivational, time, or availability barriers. Women reported childcare and self-perception as barriers more often than men (e.g. "I'm not the sporty type"). Men were more likely to mention time pressures from work but the time barriers decreased for those over the age of 55 years (Sports Council and Health Education Authority, 1992). Recently, the NHS health survey (2007) reported time to be a major barrier to performing increased levels of PA including work commitments for 45% of the males and 34% of the females and caring for others reported by 25% of the females surveyed. Although surveys such as the ADNFS and Health Profile present factual data for comparison with respect to region and sex, the data provided by participants is limited because specific responses were available to participants. Of note, a comprehensive review of 24 qualitative studies asking participants open-ended questions, identified negative school experiences,

anxiety, and lack of social network and role models as barriers to PA adoption (Allender *et al.,* 2006). These reasons may contribute to the failure of individuals in prioritising their time to initiate physical activities and shed light on the ambivalence an individual may experience when considering the pros and cons of change.

The scope of qualitative studies conducted to date is considered to be limited to understanding the barriers to participation in PARS, mainly because of superficial questioning and missing data (Williams *et al.,* 2007), thereby devaluing the trustworthiness of the research conducted. In addition, the studies are focused on process evaluation rather than collecting participant experiences (Bull *et al.,* 2008; Murphy *et al.,* 2010), meaning the studies are not collecting data to understand the lived experiences of PARS participants. The holistic value of an intervention may be assessed using qualitative methods (Crone *et al.,* 2005) and there have been studies that have captured views about PARS including reasons for adherence or non-adherence, such studies using semi-structured interviews (e.g., Taylor *et al.,* 1998; Martin & Woolf-May, 1999) and focus groups (e.g., Lord & Green, 1995; Wormald & Ingle, 2004). The participants also reported the following barriers to PARS: opening hours of the leisure centre, congestion, lack of staff, intimidating environments and narrow range of social activities available (Taylor *et al.,* 1998; Wormald & Ingle, 2004; Williams *et al.,* 2007), and cost (Salmon *et al.,* 2003). Additionally, personal factors including feeling uncomfortable (Wormald & Ingle, 2004), poor organisation and supervision during the scheme (Lord & Green, 1995), transport problems, illness (Martin & Woolf-May, 1999), weather (Salmon *et al.,* 2003), and social networks for older women (Hardcastle & Taylor, 2001) were considered important for PARS adherence.

In the first PARS RCT, in Hailsham, interviews were conducted with participants. However, the method and outcomes reported had limited detail (i.e. 50% were positive, 35% had mixed feelings, and 15% had only negative comments about the concept of a GP referral scheme; Taylor *et al.,* 1998). Additionally, large surveys such as the Newcastle Health and Lifestyle Survey (N = 6448) continued to use quantitative methods to assess barriers to PA (Chinn *et al.,* 1999). Therefore, the patient perspective of the PARS is limited in the evaluation process. Dishman (1994) recommended, nearly two decades ago, that studies using qualitative methods (e.g. Wormald & Ingle, 2004) should be used to enable an understanding of personal motivation when starting PA. However, systematic reviews and meta-analyses of PARS still tend to focus on quantitative studies (e.g. Trost *et al.,* 2002) and recently on RCTs (e.g. Pavey *et al.,* 2011). A systematic review that did include qualitative elements was highly critical of the standard of questioning and analysis (Williams *et al.,* 2007) where only 1 out of the 18 studies included was a pure qualitative study (Wormald & Ingle, 2004). The focus groups conducted in Wormald and Ingle's (2004) study identified that support received, supervision, opportunity for social engagement, and structure were the benefits of the PA intervention.

A systematic review of qualitative studies of sport and PA for children and adults stated that two-thirds of the studies (n = 15) did not report their method (Allender *et al.,* 2006). However, in contrast to the pursuit for quantitative statistics to provide evidence of effectiveness, Singh (1997) suggested that health professionals should invest in PARS and observe the results from their population in determining effectiveness. At a local level, the results of the AOR study in this thesis (Chapter 2) demonstrated that 72% (n = 1602) of referral patients did not attend their exit appointment and attendance during the scheme

was half that expected in the commissioning business case (Northamptonshire PCT, 2008). This drop-out rate is a matter of concern, considering the resources and financial investment allocated for PARS (Section 2.3.4) and indicates that AOR is not a one-stop fix for sedentary behaviour and that more than one approach to PA behaviour change may be required to meet the needs of individuals (Hardman, 2009). Nearly three-quarters of the individuals referred to AOR from October 2009 to September 2010 in Northamptonshire did not complete the intervention.

In designing a study to answer a question, Starks and Trinidad (2007) suggest that the research goals and the research audience can determine how data is collected and analysed. Qualitative research enables the researcher to understand individuals' perceptions of the world (Bell, 2010). The lived experience of an individual not adhering to a PA intervention is unknown and hence a qualitative study may provide the opportunity for individuals to express their perceptions in order to improve the attendance and adherence to PARS interventions. This research approach may be important for non-attendees who are already disengaged from a PA intervention and potentially difficult to recruit as research participants.

3.2 Qualitative Research

There is much debate around the research paradigms (i.e. positivism, post positivism, constructivism) with emerging views on how to best obtain knowledge (Guba & Lincoln, 2005). Post positivism and constructivism paradigms lead to a qualitative approach, characterised by ontology, epistemology, and methodology (Guba, 1990). Qualitative approaches range

from inductive methods whereby theory emerges from empirical research through to deductive approaches which are based on conceptual modelling and pattern matching. Qualitative methods can include case studies, focus groups, observations, document reviews, open-ended surveys and interviews (Bartholomew *et al.,* 2006). Qualitative research intends to provide rich in-depth data (Hardcastle & Taylor, 2005) and is thought to provide relevant answers rather than just measurable outcomes (Black, 1994). A qualitative approach with open-ended questions allows the participants to provide details in their own words and allow transparency in the interpretative process (Elliot *et al.,* 1999; Rapley, 2001).

Guba (1981) proposed a model to assess trustworthiness of data for ensuring rigour during the research process: truth-value, applicability, consistency, and neutrality. Owing to the philosophical differences of qualitative and quantitative approaches, different strategies are used to assess the criteria of trustworthiness for qualitative studies with procedures to adequately affirm trustworthiness. The term truth-value refers to the credibility of the data whereby others in similar circumstance would recognise the descriptions. Applicability refers to transferability, which is often the task of the individual transferring the research rather than the originator of the data. Consistency refers to dependability that is ensured by trackable variability. Neutrality refers to confirmability whereby the neutrality of the qualitative research is between the researcher and the data rather than the researcher and participant, as would be the case in a quantitative study. Sparkes and Smith (2009, p.493) commented that with processes such as member checking to check with the research participant that the analysis is a reasonable analysis, Lincoln and Guba (1985) have "paid lip service to ontological relativism". Sparkes (1998) had previously commented on

the value of member checking when appropriate to the inquiry. Having followed critique and literature reviews since 1985 and reserving the right to change their position on conducting qualitative research, Guba and Lincoln (2005) developed non-foundational criteria for judging the processes and outcomes of constructivist inquiries (i.e. fairness, ontological authenticity, and educative authenticity). Additionally, since the prior naturalistic inquiry assertions were made by Lincoln and Guba (1985), they did in hindsight include axiology (ethics, aesthetics and spirituality) as a foundation for the renamed constructivist paradigm, enabling discussion of spirituality when conducting human enquiry and the integration of ethics within the paradigm. Hence, the research domains continue to evolve. Consequently, the evolving philosophical foundations can be challenging for researchers to justify and apply to qualitative methodologies, especially in fields of research where objective measures are traditionally used (i.e. sports & science). Nevertheless, elicitation studies are encouraged to better understand individual beliefs about PA to be able to better design interventions to meet their needs (Downs & Hausenblas, 2005).

A range of qualitative approaches was considered for Study 2 (i.e. Grounded Theory, Glaser & Strauss, 1967; Discourse Analysis, Potter & Wetherell, 1987; Narrative Analysis, Murray, 2008). Discourse analysis is concerned with the role of language in the construct of social reality rather than the nature of phenomenon (Willig, 2001) and hence was not considered the appropriate method for this study. Although Grounded Theory (GT) can enable synthesis towards a theory, it tends to be interested in social processes rather than the individual's experience (Charmaz, 2008). Narrative Analysis aims to obtain a detailed account of an experience, the chronological sequence of data including the beginning, middle, and end of the story is required which does not allow the

same flexibility of Interpretative Phenomenological Analysis (IPA) that allows focus around specific concerns. The data obtained through IPA is thought to be more informative, providing a deeper meaningful understanding, than the data obtained via prothematic analysis (Warwick *et al.,* 2004).

3.2.1 Interpretative Phemenological Analysis.

IPA is a qualitative research approach committed to the examination of how individuals make sense of their major life experiences (Smith *et al.,* 2011), hence suited to Study 2. It is based on phenomenological psychology and philosophy (Giorgi, 1995; Husserl, 1970) and hermeneutics – the interpretative analysis of text. The "bottom up" approach is widely used to explore lived experience in health care (Reid *et al.,* 2005; Brocki & Wearden, 2006). An example of a PA IPA study is the study of Darker *et al.* (2007) that showed that the perception that walking was not a "proper" exercise was one of the barriers to a PA walking scheme. This consequently helped identify the disparity between health campaigns. IPA positions the research participant as the expert of the lived experience (Reid *et al.,* 2005) and the researcher as the primary analytical instrument (Fade, 2004, p. 2).

IPA has three core theoretical perspectives: phenomenology which is the philosophical approach to the study of experience, hermeneutics including the theory of interpretation and idiography which is concerned with the particular experiences (Smith *et al.,* 2011). Reflexivity is important when using IPA methods to understand a lived experience because it exposes the self-perceptions of the researcher. The research participants are trying to make sense of their world and the researcher is trying to make sense of the participant

making sense of their world (Shaw, 2010); this is also known as double hermeneutics (Smith *et al.,* 2011).

In contrast to other qualitative methods, GT is used to identify recurrent themes across the range of participants (Glaser & Strauss, 1967). GT seeks to establish claims for a broader population, whereas IPA is not concerned with bringing the themes together into generalised statements. IPA leaves the individual accounts to have identified convergences and divergences as standalone individual lived experiences.

With the researcher being the instrument of the data analysis for an IPA study (Fade, 2004), concerns can arise regarding researcher bias, otherwise known as personal impressions, whereby another researcher may report different conclusions (Mays & Pope, 1995). However, it is recognised within the qualitative paradigm of science that interpretive perspective to inquiry (Whittemore *et al.,* 2001) should be analytically rigorous and explicit (Patton, 1990). The methods used to satisfy credibility criteria are detailed later in this Chapter (Section 3.4.4). Understanding that a personal account is "dependent on, and complicated by, the researcher's own conceptions which are required in order to make sense of that other personal world through a process of interpretative activity" is important (Smith, 1996, p.264).

3.3 Aim

The aim of this study was to understand the lived experience of non-adhering AOR participants.

3.3.1 Research question.

What was the lived experience of non-adhering AOR participants?

3.4 Methods

3.4.1 Participants.

A non-attendee was defined as a patient referred by a health professional to AOR who attended less than 10% of the activity sessions available, i.e. fewer than 4 sessions out of a possible 35. Fifty invites were sent to non-attending participants from a leisure centre requesting a reply slip to be sent to the researcher if they wished to be involved in the study. Three replies were received from these invited AOR non-attendees and an additional eight enquiries were received from non-attending AOR Study 1 participants. The AOR enquiries were made to check if they were to complete the 6-month follow up questionnaire (Section 2.3.4 of this thesis), as they did not complete the scheme. Eleven interviews were conducted, but during the interviews, it became apparent that some non-attendees had attended more than four sessions yet labelled themselves as non-attendees. Seven individuals met the criteria including one individual who had re-engaged after six weeks of four or fewer sessions and were included in the study. Smith and Osborn (2003) stated there is no specific sample size for such research and that the richness of the data is important in such cases. However, a sample size of ten participants, on average, is thought to be less generous but more idiographic (Reid *et al.,* 2005). With participant consent, interviews were conducted and audio recorded, mainly in the participants' homes; two individuals preferred meeting at a leisure centre. For protecting the identity of participants (Guenther, 2009), the individuals were

asked to choose their own pseudonyms. Table 3.1 shows the participants' information.

Table 3.1

Participants included in study (n = 7)

Pseudonym	Age (yr)	How participants were recruited	Reason for referral	Ethnicity	Attendance	Sex
Dav	42	AOR Non-attendee	Bad back Weight	White British	Induction	M
Heidi	34	AOR Non-attendee	Depression	White British	2nd referral 0	F
Max	50	Query Study 1	Weight Loss Mobility	White British	0	F
Pol	59	Query Study 1	Back Problem	White British	2	F
Mr T	51	Query Study 1		White British	0	M
Patsy	62	Query Study 1	Weight Loss Diabetes	White British	3–4 wk	F
Linda G	59	AOR Non attendee	Mobility Cholesterol Depression	White British	0, 1, 6 wk	F

3.4.2 IPA interview schedule.

IPA was selected as the method to collect and analyse qualitative data (Section 3.2.1). A semi-structured interview schedule was designed to allow flexibility during the data collection (Chapman & Smith, 2002). It was piloted with a service users group that had shown an interest in the study. Recommendations included to shorten the patient information sheet and to make the language used in the questions clearer (Appendix C.1). Engagement in the research process was encouraged by understanding the reason behind non-adherence to inform change and to potentially improve the AOR service (Clark, 2010). The rationale behind conducting the research was highlighted to the participants via the study information sheet and during initial verbal communication with potential study participants.

3.4.3 Data analysis.

There is no single prescribed way for analysing IPA data (Smith *et al.,* 2011) and creativity in the process is encouraged. However, one must be careful not to compromise the quality of the science of the study (Whittemore *et al*., 2001). The underlying principle was to make sense of the experience of non-adhering AOR participants. Smith *et al.* (2011) tentatively suggest an IPA framework (Figure 3.1), which was adopted in this research.

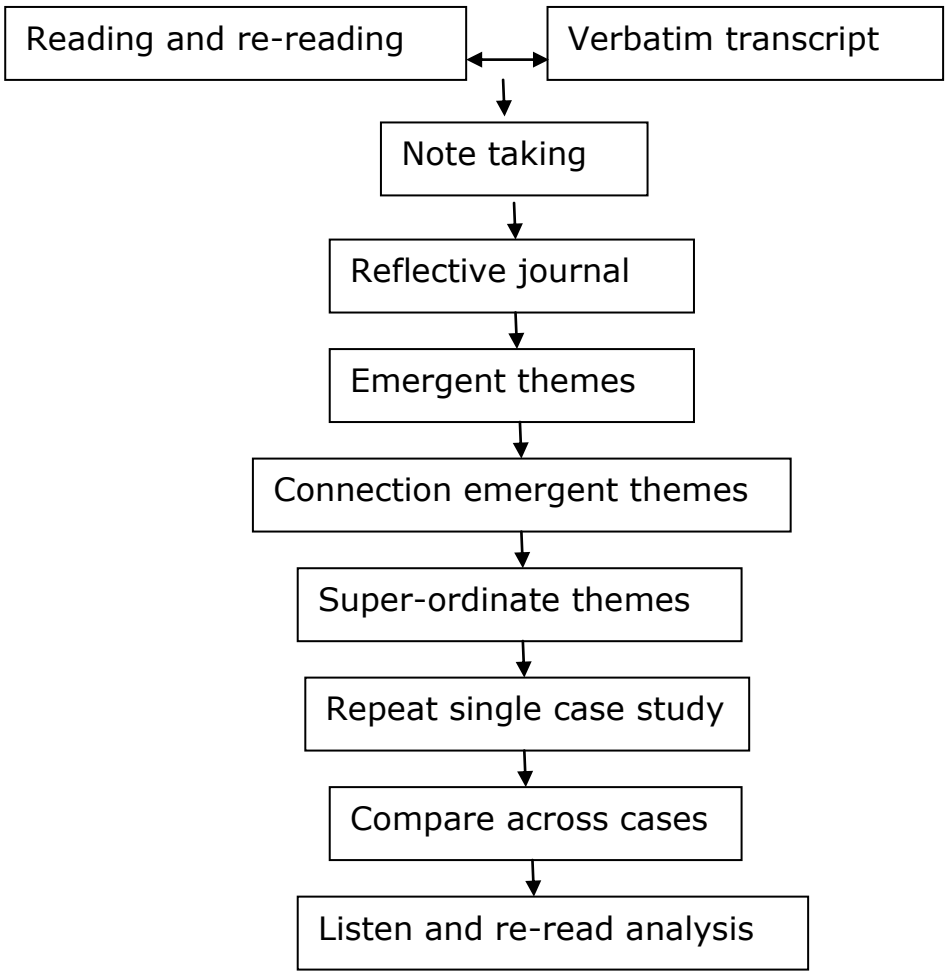


Figure 3.1. IPA analysis process of data analysis used for study.

Individuals' transcripts were read whilst listening to the interview audio and re-read whilst typing the transcript. Any initial recollection from the interview or impulsive thoughts was recorded so that they could be eliminated; in addition, the noise from the interviewer and the interview process itself was removed to enable the participants' accounts to be clearly heard. The following process was conducted three times: the audio was listened to and transcribed verbatim, the transcript was read with the audio playing, and then, the transcript was read with the participant's audio playing. The reading process was to enable the researcher to hear the participant's account and identify rich, detailed sections of

data. Note taking was done whilst reading through the transcript on five occasions to capture the descriptive element of what was said; then, the sentences were read backwards from each paragraph for exploring "What did the participant mean?" The descriptive, deconstructive, and conceptual notes were recorded in different colours. For the note-taking process, a reflective journal was maintained by the researcher. Emergent themes were identified and recorded in a tabular form alongside the transcript and themes were arranged chronologically in the far right column (as seen in Appendix C.2). Connections across emerging themes were explored and themes typed into an independent list to connect magnetic themes. From this collection of emerging themes, super-ordinate themes were derived. The process was then repeated as single cases. Once all cases had been analysed, super-ordinate themes across cases were established. Analysis continued through writing as reflexivity was added to the selected dialogue from the individual cases. All transcripts were listened to post writing and the analysis checked for key content to ensure the participant's voice was communicated throughout the analytical writing.

3.4.4 Trustworthiness.

Credibility (Section 3.2) was addressed by member checking a case to gauge the agreement of a true account of the interview and that the analysis was a reasonable interpretation, thereby reducing the chances of misinterpretation (Lincoln & Guba, 1985). The audio data transcript, related analysis, and member check notes can be seen in Appendix C.2. Therefore, in terms of transferability, should the analysis be transferred, the methods have been clearly detailed (Section 3.4). Dependability has been ensured by an auditable research study,

including audio recordings, transcripts, notes, and supervision meeting logs. Additionally, as suggested by Elliot *et* al. (1999), disclosure of personal anticipations is good practice when conducting qualitative research, specifically for IPA (Brocki & Wearden, 2006), where the researcher acknowledges preconceptions that may influence interpretation of the individuals lived experience. Hence, in terms of neutrality, a bracketing interview was conducted prior to the interviews to assess for researcher bias and to enhance trustworthiness (Walker, 2006). During this process, the researcher disclosed and acknowledged family/partner experiences linked to physical and mental health and past experiences when delivering PA sessions and personal connection to living a physically active life. Thus, awareness of the researchers' personal and professional experiences of PA and increased academic knowledge gained during this PhD study had an impact on how the researcher made sense of the data. Consequently, neutral access to the subject matter was unlikely (Brocki & Wearden, 2006). In addition, the knowledge and experiences of the researcher enabled rapport to be established at the beginning of the interviews between interviewer and interviewee. With this awareness and a reflective journal of the research process and reflections before and after each participant interview, the researcher maintained the awareness to limit influence during the interview process. Additionally, when analysing the transcriptions, to encourage reflexivity of the analysis (Biggerstaff & Thompson, 2008), the researcher was supervised by a published expert and IPA researcher throughout the study to assess IPA competence and provide support via the IPA online forum. Additionally, the supervision allowed for sensitivity checks of the researcher and monitoring of self-care (Dickson-Swift *et al.,* 2007).

3.5 Results

3.5.1 Researcher participant background notes.

Notes were written after the session with each participant and the initial perception of the individuals is shared below.

Dav suffered a traumatic life-changing bike accident and is now in constant pain and requires a wheelchair for mobility. After rescheduling the interview, he met me at his front door and was obviously in pain when he walked. Throughout the interview, he mopped the sweat away from his brow and occasionally looked physically uncomfortable. He was fearful about increasing pain and what other people would think of his scarring. Whilst accepting that the pool may be an option for PA in the future, he is considering dipping his toe in the water as PA without direct weight bearing is less painful.

Heidi was happy to be surrounded by her children in the safety of her home. I was unaware that she was anxious about the interview until she mentioned she had not slept well the night before. She experiences anxiety which limits her everyday activity, so she can quickly become unstable. Cost and social challenges prevented her from joining a gym, although she considered attending a dance class accompanied by family/friend enjoyable whilst accepting that is might not happen because of other priorities.

Max met me in clothing that could be pyjamas, and during the interview, a king-size bed was delivered to her house. When she met me at her front door, she was stooped and clearly in extreme pain, shuffling rather than walking and using props to support her limited movement. She is awaiting a gastric band surgery and had extreme limitations in mobility due to unstable knees. She is mainly

housebound and getting up from a chair requires extensive effort. Physically, she is unable to perform gym activities; mentally, she is exhausted; and socially, she embarrassed about being overweight. To improve her circulation, she prefers massage therapy.

Pol was upbeat and was pleased with the AOR scheme. However, because of her physical health condition, she was unable to continue. She experienced a back injury that may have been caused by her natural nature to over-do it. Once her back problem is resolved, she intends to re-engage in AOR, via her GP.

Mr T feels he has a second chance at life. We met at the leisure centre of which he is a member. He considered the membership cost of the council-run gym and a private gym and chose to join a private gym. He regularly swims because it takes his physical pain away. His mobility was severely limited and he needed to use a motorised scooter.

Patsy invited me into her home and mentioned that she was dissatisfied with the AOR scheme. Her initial enthusiasm for the scheme was reduced because of the lack of professionalism of the leisure centre staff. She was critical of the guidance and support received and concerned about the impact of unprofessionalism on others like her.

Linda G met me at the leisure centre she is pleased to be a member of. She was absent during the first six weeks of the AOR scheme, but because of persistent phone calls from fitness professionals, she reluctantly attended the mid-way review and because of the level of care she received, she re-engaged and is now a regular gym user to the point of addiction. She was a passionate ice-skater and being physically active helps her reconnect to her youth and sense of worth.

3.5.3 Member check.

Dav completed the member check and he strongly agreed to the findings of the interpretative analysis of the interview. This was reflected when he said,

> I thought it was spot on. They were spot on. There weren't a bit where you got it wrong, not a bit of it...You got me down to a tee, think it is brilliant. And screaming to get out. You got me good and proper, you got my heart.

3.5.4 Themes.

This section presents the inductive process of collating emergent themes from the interviews with non-adhering AOR patients. A total of five super-ordinate themes emerged, each of which contained a number of sub themes. Table 3.2 shows the super-ordinate and sub themes.

Table 3.2

Master table of emergent themes: Non-adhering participants experience

Super-ordinate Themes	Sub Themes
Referral to AOR	• Medical referral • Leisure centre • Improvements
PA	• Perception of PA • Current PA • Future PA intentions
Self	• Physical • Mental • Social • Quality of life
Relationship with others	• Health professionals • Fitness professionals • Friends and family
Behaviour change talk	• For • Against

3.5.5 Referral to AOR.

3.5.5.1 Medical referral.

All participants spoke about the health professional referring them to AOR. There was a mixed range of responses, ranging from a positive self-referral to utter shock of being referred to a PA intervention. Positive experiences were not expected having assumed that non-attendees were put off by the experience they had either with the health professional, fitness professional, or during a session at the leisure centre.

Pol self-referred and was pleasantly surprised at the ease of the AOR referral process. She felt confident enough to ask her GP about the intervention but was not expecting an easy ride and thought it would be a challenging process to attend the gym; however, she was pleasantly surprised.

> Because I have problems with joints and everything else, have got osteoarthritis and erm problems in my back, I said to my GP, can I be referred to you know do some physical activity at gym....yeah, fine... that was it, thought that's easy, you don't have to fight for it.

For Patsy, it just made sense to be part of a structured scheme that provided a much better alternative than taking more medicine. This enabled her to practically do something that would benefit her health condition and helped her feel more in control. She was working in partnership with the health professional who considered it an option for Patsy. She seemed very self-aware and keen to invest in her health.

> I think I was getting a bit err frustrated, not getting anywhere. She did suggest we need to up the insulin, go to three shots a day rather than the two. And I think I began to feel that was not what I wanted to do, I thought this is going down a slippery slope that isn't a good thing, I said to her if I could get more exercise that would probably help I think. Then she said we have got this thing that we are doing at the moment...

Linda G expressed her passion for being physically active and the respect/loyalty she received from her GP. It seemed the natural solution to bring her out of the hole of depression and the referral was welcomed. She spoke honestly and seemed to know her condition well.

> When I came to the first referral, I am quite depressive anyway and er I get SADS in the winter. I came because my doctor referred me, because I have been with my doctor for 20 years, he's known me and he knows I like activity. One of the reasons I have had problems with my health is because I have not been active and lots of other factors that I won't go into.

Heidi viewed the referral as a positive opportunity initially, but with everything else going on at home, she was unable to see the referral as a priority whilst facing issues like anxiety and lack of courage in leaving the safety of her home. Although there was hope that she would partake in an activity to connect her to others, on reflection, this was not what Heidi wanted at this time.

> "Really excited...But I am just not ready for it".

Although Max had jumped the hoops the medical staff had given in the past in order to get a gastric band fitted, and going to the gym was not an option. The referral was perceived to add to the pain and grief experienced in everyday life and not something she wanted to put herself through. During the interview, Max was hunched over and barely able to put one foot in front of the other; it was bemusing that with such a level of immobility she could be referred to a gym.

> I was referred back to the doctors and then referred to the gym which I couldn't do (phone rings). They said what I had to do was, to get my knee operation I needed to lose weight which I can't barely walk so I'm not able to go to the gym.

Dav was shocked that the referral process was not thorough in considering his needs. He checked that the research process was confidential and then started to look for the referral paperwork to prove there was missing information. The referral was for an acute back problem; Dav was unable to stand up without physically sweating and his movement was very awkward. There was a high

level of annoyance because the referral system was not meeting his individual needs.

> "Doctor didn't put everything in the referral. The gym instructor didn't even know a quarter. He just said erm acute back pain. That was it".

On asking Dav what the AOR referral conversation was like with his GP, although Dav spoke of a good relationship, he could not understand why he was being referred. It was totally off his radar and took him by surprise.

> (laughing) "And erm he said, he said I can refer you to the gym. I sort of looked at him I looked at him and thought gym what the ... hell are you talking about?"

There was a negative personal reaction from Dav after the referral, stimulating his defensiveness and resistance.

> ..."referral took me back a bit".

The referral was inappropriate. Although the tone of voice and body language communicated very clearly his shock at being referred, Dav did not articulate the words to say he did not want to be referred to a gym to the health professional. It was assumed that he would go.

> "I didn't let him know".

Mr T took the referral process into his own hands. After being referred, he compared the costs and chose to attend a private facility. It just made sense to get the best value for money as he intended to be a regular user.

> "I, I done this all myself. Because the doctors referred me to a scheme think it's run by council. Erm it was £10 for a session, but after that was just an induction..."

3.5.5.2 Leisure centre.

Experiences of induction at the leisure centre varied. Each participant was able to articulate what he/she expected in order to meet their needs and highlighted discrepancies in the services they received.

Pol was all praises for her gym experience and the services, whilst accepting responsibility for her PA behaviour change. She appreciated the time and information the fitness professional gave her to enable her to be physically active given her health conditions. Although guided, she maintained a sense of self-responsibility for her actions after induction. She spoke with confidence and an air of positivity.

> Yeah, really good, lady up at the gym, she went through everything with me and you know because of my history with my back she was very you know don't overdo it, sort of thing, perhaps when I went I perhaps pushed myself?

Max did not attend the initial appointment at the leisure centre, as she considered it just too much effort and the consequence of pain resulting from going too much to handle. She felt a lot of pressure to attend but she felt the experience would have been embarrassing and traumatic both physically and mentally. The anxiety of attending the gym was too much, so she thought it better to do nothing than to be so far out of her comfort zone. Although Max portrayed an outgoing character on first impression, there was a depth of frustration and insecurity about her future quality of life.

> Though good idea if you're able, I can't get from here to out there. I am not going to be able to do nothing at the gym ... If they would have said dangle off that lamppost I would of had to of done it even if I didn't want to do it. I used to go to the gym years ago, if it wasn't about mobility then I would have gone. It's alright for them to say to go swimming you have got to get dressed you got to get out to pool, got to get in it, got everyone staring at you, that's another thing cause you can hardly walk properly thought it was a horrendous stressing thing that I wasn't prepared...

Heidi spoke openly about the instability of her mind and how she needs to be mentally prepared to attend the gym. She spoke of the challenges in expressing herself to professionals and the level of discomfort in communicating her needs – a reflection of her inner world and a potentially traumatic experience that she really could do without.

> Didn't want to go up to a gym where there are loads of people when you have got agoraphobia and you like you just can't say

> what I am going to be like tomorrow do you know what I mean. Like I am like three different people. Family have come to accept that. When you go to the doctors and try to explain what sort of help you want you can't explain, cause you don't know what you want.

Heidi's children were her priority. The induction fee at the leisure centre was the main practical consideration that was a higher priority than attending a gym to conduct physical activity.

> "...just more money that I need put into my boys, kids and their future".

Linda G re-engaged after 6 weeks after being contacted by the leisure centre staff. The initial experience did not meet her expectations and she did not feel a sense of belonging and therefore backed off from the scheme. Because she was not valued, she did not invest in the scheme initially.

> "That was that just drifted off, can't be bothered got to find somewhere to park... I thought, I'm not happy with it, didn't want to do it, so I didn't".

The initial induction experience for Linda G was stifled by concerns for medical health and the fitness professional wanting confirmation from specialist health professionals that she could use vigorous exercise equipment. Combined with a low perception of herself, this may have made Linda G feel inadequate. She wanted to connect back to past PA experiences where she had reaped the rewards of positive mental health and an increased sense of value. The six-week review conducted with a different member of staff was more engaging and rekindled her connection to being physically active. The review was a relief and she is grateful for the opportunity to attend AOR.

> When I came with _____I had not done very long, I had done 5 minutes on one thing and 10 minutes on another that was it. Only done about 15 minutes. With her, I was in here for about an hour. And so, I got that buzz. I had forgotten that buzz. I had forgotten the buzz you get from PA. Went away feeling really good. What is this feeling, what is this feeling? When I got home why am I feeling like this? I am happy. Honestly, this is what I have been missing.

Patsy openly expressed her concern about the service provided at the gym. She seemed to want to get it off her chest to ensure that her experience was heard and that something was done about it to prevent others going through the same. Patsy was keen to provide the details to explain her disappointment at such an unprofessional service.

> They were very young, I felt very young, not very experienced, not terribly professional. My feeling when I actually left was, I only went three or four times my feeling was it was very sad and it was

> a waste. If it had affected me like that how many other people had attempted to do this. Thinking it was going to give them a lot of help with their condition and what they must have felt also. Did they feel the same way I did a bit disillusioned with it all?

Patsy's initial enthusiasm for AOR was crushed by the lack of support provided. She was proactive and hopeful the referral would help her control her diabetes, help her with weight loss, and help increase her mobility. In order to achieve this, she required guidance from fitness professionals that seemed unavailable. Consequently, Patsy did not connect with the gym environment.

> You were literally, whizzed around shown equipment how it worked and you are on your own...And then after that, that was it really, you didn't see anybody unless you went up to someone and asked. In fact a couple of times, I asked people that were in there. When I did go to desk to ask this chap young chap that was there, he was on computer shopping for himself, obvious. Could see screen could see what he was doing. I thought you could be helping people like me rather than just ignoring everybody. It was like I have set you up, I'll just ...not what you should be doing in a gym you should be wondering around, checking people are okay.

Dav found the initial experience intimidating. He did not feel that he belonged in the environment and although he had overcome challenges to attend, he felt that the fitness professional would not expect him to return. Alongside the physical limitation of not getting a wheelchair into the space, the process was mentally overwhelming as well; this was echoed by a post-induction conversation with his partner. At such a basic level of need, Dav was let down and clearly expressed a sense of despair after the induction ordeal.

> "My partner said, Dav if you would have been in the chair then you would have been snookered. (Yeah) Cause there was just no way in the world that I was getting in".

3.5.5.3 Improvements.

All research participants were keen to give suggestions to improve the scheme from their perspectives because of the diversity of concerns. Common themes included appropriate cost, similar ability groups, and mental health awareness.

Basic physical provision of access was one of the key recommendations by Dav.

> "I can imagine now it has been refurbished, it's got wheel chair access".

Dav clearly linked his mental and physical health, stating the referee should better understand their patients' mindset, especially in circumstances when the disability had not been accepted by the individual.

> "...people with er people with disabilities shouldn't be referred until the doctor knows where there head is at".

Dav's comment about his perception of others in the gym was also loud and clear that he did not fit in.

> "...it's very daunting for people to go into a gym when you have King Kong over here and Martine Navratilova over here. And you haven't done exercise for years, you feel like piggy in the middle".

Additionally, for Dav, financial cost was considered prohibitive, especially if the users were only to use specific facilities such as the swimming pool because of extreme mobility challenges.

> "Ah the cost...I mean, how much is it to use the pool, £5.50?... Of course I am happy to pay for it. But a fiver to go swimming?"

Mr T agreed with Dav that the investment should be appropriate. In his proactiveness to be a member of a private health club, achieving value for money seemed a sensible decision.

> "All in package for £20 a month. Well, where the council run one would cost anybody a fortune".

Heidi expressed the challenge of communicating her needs to the GP and a sense of not really being heard, potentially increasing her isolation experienced in her everyday life. She saw AOR as an opportunity to link people that can support each other rather than an environment where differences are emphasised.

> Listen to them a bit more. Like. Give them that little bit of help they need. It is hard, feel intimidated sometimes when you go to the doctors do you know what I mean. I am not stupid. Do you know what I mean. Sometimes I feel stupid. Hard to get through everyday life really. You could do more groups with women that feel that way.

Linda G remarks on the impact of the time of the year, as she coped with depression infused with SADS. Hence, mustering up the energy to go to the gym was over-ambitious, especially if you did not feel part of the environment once you got there.

> I think if the induction had been at this time of the year rather than in December... Weather makes an enormous impact on me, even like the change in temperature today, erm do I want to swim? once you walk in here...it's not in gym, erm you know it makes a difference and it's ok, but I think if that had been at this time of year I think it would have made all the difference in the world.

The quality of the relationship with professionals was crucial to Linda G and made all the difference in supporting her. Rather than guessing the solution within a complex situation, an effective relationship enables the sharing process to be more efficient and enjoyable. Linda G's understanding of finding the right key was to her a significant finding to support effective PA behaviour change.

> But unless you've got that key you have got to have a key to turn ... I suppose the difficulty is, everybody is different so everybody is going to have a different key. You can't know what that is, unless you are close to that person you can't know what that is. So I would say you have got to have someone who really knows that person well, friend or relative or you know, or you just happily by chance I happened on...

Max expressed her concerns of being a burden to others. Additionally, the embarrassment of being referred to a fitness professional who would not know what to do was overwhelming. During the first meeting, she related to me and was appreciative of the time and space to talk about her needs, without judgement. The first contact made by the leisure centre was crucial in engaging Max into AOR to eliminate some of the perceived fear; she wants to be heard.

> You need someone like you, someone knows what your needs are like that's why I didn't go to the gym when they referred me, I don't know the bloke at end of phone, he doesn't know me, all he knows is that I have been referred and he looks at me and thinks oh my God what can I do with you.

Max is disillusioned with the service received to date and suggests effective communication between the professionals would help improve the efficacy of the interventions available without causing additional harm and anxiety to individuals. The impact of the referral and non-attendance potentially created bubbling frustrations, which may have been masked by a confident persona when communicating with others.

> Think the thing that would help, Peter needs to talk to Paul, need to talk, no good referring people to something just because they are fat. Why are they fat? Are they fat because they sit at home eating pork pies all day and are lazy then yes refer them to the gym and have them? Or are they fat because they are not going anywhere.

Mr T speaks about the strategic reasons behind performing PA and recommends finding creative activities that people can engage in and then focus on what is possible rather than being stagnated in the mindset of disability – a very positive reflection, given the extensive life challenges that Mr T disclosed during the interview.

> ...whatever is wrong with them, whatever is wrong with them or wrong with you, whatever it is, got to look beyond that and look even if you have never done physical stuff even if you have never done physical activity in your life. If someone got in water, takes away pain, so it's cause my illness is pain continuously. When I go into water it takes away my pain, so that inspires me to come, cause I am sitting down 80% of my time now, I can't walk to exercise. I can swim further than I can walk.

In addition to the technical guidance at the induction, Patsy would have valued follow-up support and genuine care. This would have added value to the experience and helped reduce her fear of getting it wrong and potentially harming herself more. The following states her expectation of what should be available in a quality-assured service.

> "Nobody phoning saying phoning up and saying, you haven't been is there a problem can we help? Rather than no contact at all".

3.5.5.4 Referral process summary.

In the super-ordinate theme about the referral process, there is vast divergence of the experience at the point of referral with the health professional, with some choosing to self-refer and others told to induct themselves into the scheme which evoked reactions from each of the participants. Demonstrating there may be an impact for an individual when directive, guiding and following communication styles are used to promote PA behaviour change. The driving motive behind referral to AOR for all participants was improvement in health (mental and physical) by becoming physically active; some participants openly accepted this motive, while others used sustained talk to explain why it was inappropriate for them to be physically active. The intention of the referral to AOR was clearly understood, i.e. that it was an opportunity to increase PA levels in order to improve the individual's health. The individual's perception of PA, current PA, and future intentions are explored in the next section.

3.5.6 PA.

3.5.6.1 Perception of PA.

Dav expressed the disturbing consequence of being physically active, painting the real picture of his physical limitation and the challenge of using his wheelchair.

> It'll hurt going to the shops. It means getting it out of there getting it out of that cupboard there and getting it out of the block, then getting in it, going down the shops and coming back and so I (small laugh) I just bite the bullet and go on my stick. Erm, but then just in pain. It gets you down, pain... Makes it a lot worse.

Although the thought of going to the gym was not acceptable to Heidi, she was able to express an alternative PA, signalling an inner awareness of what is inherently good for her. She came alive, when talking about dancing.

> ...like dancing and stuff like if you did that I'd be like yeah ok, but going to the gym and running and stuff like I hate it that not my thing.... Don't need the gym. What's the gym going to do yeah ok makes you feel healthy, not everyone is like that.

When asking Heidi about the benefits of PA and her mental health, she gave a direct response.

> "Nothing".

Linda G shared her self-awareness and potential to fill her social void with PA. She felt it was something she could do with the time she had and an opportunity to feel better about herself, which she eagerly embraced.

> ...got back to my love of activity through this. Erm and er, whenever I have been active in anything, like when I was skating, skating having blinkers on, only do skating, if you don't skate for a day you will forget it all. It's like here, if I don't come to the gym for the day or don't come to swim for a day I won't be able to swim, I will have lost my fitness and will have gained the weight, I am like that so I have to be very aware of that.

Linda G is delighted that she found PA again and is better able to cope with the depression when life events occur. It seems that PA is now Linda G's medicine.

> I think, for me, it's been absolutely wonderful really. I can't say it has solved everything, like I haven't got a partner, my cat is on his last legs, that will be the next thing if anything happens to him. You know I am worried. That will be reactive depression it wouldn't be endogenous depression which is what I was experiencing then.

Max values the potential of PA and if she had better mobility, she would happily to go to the gym; she is aware of her own condition and her limitations, expressing that she is fed up with the situation.

> I used to go to the gym years ago, if it wasn't about mobility then I would have gone. ... But it is a gym to get you healthy, it's not something they can't help my knees, nothing that I can do to make me lose weight, cause you have to be active. Have to be on walking machines, bikes and the swimming and all that. Swimming is good but can't do it for hours. Cause my knees will seize up.

For Max, the consequential severe pain, despite the positive outcome of being physically active, is something to be avoided. Along with having to cope with day-to-day activities, the additional level of challenge would be too much.

> Two days later my legs were hurting, I mean I have got crutches I don't go far, we parked right outside, getting up and getting in, then getting back up, normal things that everyone else takes for granted that I found really hard and so next two days I was in agony. That's why I don't do it. That's what that's what my argument was with the doctor it's alright you saying this that and the other, I have got to sit at home like a cabbage...

However, Max can identify with benefits of being mobile; including returning to her previous quality of life and work. She felt stuck and not really herself.

> Means everything. Number one priority. PA and to do it pain free is the top up on my first on my list, that is why I am going through all this pain. Can get you really depressed and sometimes you get arghh want to go. Don't know how able bodied, want to go back to work.

Pol articulated her understanding of the benefits of PA and her medical condition, so much so she self-referred and proactively looked for solutions and was determined to improve her PA levels. Her confidence shone through.

> "Because I have problems with joints and everything else, have got osteoarthritis and erm problems in my back, I said... I know exercise is good..."

Pol's positive, determined attitude to the referral and line dancing was evident. Her end goal was to improve fitness so that she could feel better about herself whilst normalising her medical condition.

> "I was thinking this is going to be really beneficial, I am going to get fitter be more active, be able to do more and actually feel healthier. With line dancing it's great fun and I am learning something".

Mr T highly valued PA for both physical and mental benefits. He was self-determined to perform PA against the advice of health professionals and was determined to continue to self-heal.

> I know it does. Cause what happened to me K. It affected my bowels and my er weeing. And er before I started swimming it was painful for toilet and stuff like that you know. And then once I started swimming I found it no problem then. So I know, I know my own head, I know my own body. So I knew that that was that this was the right thing to do for myself. And not only it was not just only for my illness, for my mental. You know because I was so depressed. That you know it's it's it was terrible. You know, I was you know I was going to take my own life to be honest.

It helped Mr T to feel better and he has noticed his own improvements.

> ...when you're sitting round, I know it's no good for me, so started swimming, and er lost a bit of weight, got back in trim er cause I lost weight it's easier for me to walk, less er painful when first happened. Terrible because had a bit more weight.

Patsy honestly reflected her dislike towards for the gym. She spoke with conviction, stating that others may also feel the same and it is just something you have got to do. No enjoyment was evident.

> I suppose it's a means to an end. I'd be lying if I said I enjoyed going to the gym because I don't enjoy going to the gym, not any aspect of it. Hate the music, hate the smell. Most of the people there are so self-obsessed they don't look or talk to anybody else. And erm, I think the whole experience is horrendous. I hate it. If I could afford to have a big house with my own gym and pool. It is a means to an end, not a pleasurable thing at all. ... I think it is boring. Erm so no, not a thing I would choose to do, if I could get away without doing it I would, if I could get the same effect by doing something else, I would because I think the gym is horrible.

3.5.6.2 Current PA.

Dav takes the time to develop arm strength for using his wheelchair. The frustration of not being able to do more was obvious and physical perspiration during the interview demonstrated the level of pain he constantly experienced. Life seemed hard for Dav.

> "Build my arms up, barbells under there. Build my arms, have got to when I'm out in the wheel chair. I am 15 st. It's very hard. It's a manual wheelchair not automatic one. Manual, self-propelling".

Linda G uses PA to relieve her mental anxiety. This in itself can present new challenges of managing how much PA is enough; for example, her conscious awareness of potentially running away with herself. At current, she needs to work out daily to maintain mental stability. She articulated a worrying sense of uncertainty of being able to keep up the pace and used PA to fill the gap for loneliness and the gym to escape.

> I can be in there sometimes 2 hours sometimes 3 hours. 20 minutes...then going for a resistance run so that is at least another 45 minutes, by the time you have done resistance exercises, come back in here and do cooling down, very often I don't cool down if I am really into it. You get addicted to treadmill. You can see why...press the lever again and again you get on it and it's like you are somewhere else, you are just going, just going going going. Erm analogy of life really, said to _____ said that's really deep if you don't keep going fast enough you fall off the end.

Max is unable to perform PA because of the severity of pain, and even adjusting sitting movements was uncomfortable. She feels isolated and misunderstood by others. It was obvious whilst interviewing Max that she was physically suffering with her level of physical discomfort, reflecting that others in her situation may feel that way too.

> Pain is horrendous. People look at you and think you are lazy, like come down, come down they wanted me to come down to their nans with them I don't want to, alright I don't have to walk far, I am sitting in the car, but you have got to get out of the car...then it's the sitting down and the getting up, cause what it is you can stand up and sit back down takes about 5 minutes to get going and then you get going and then you got to sit back down again stiffen up, not like a process, same process all the time throughout the day cause got to sit down because they are hurting you think awww stand up and really stiff, got to go through all that again. It's really tiring believe it or not, so by 6 o'clock I get grumpy as well.

A niggling sense of "what if" persists in Pol's life. Although she was determined and externally positive, she was concerned about her health, as she feared health deterioration. She was externally coping well.

> Pain, don't get that much pain in my back now, its slip discs you see well they are protruding. So I am always aware, bending down, leaning over bath to get to other side, just a simple action. Erm, always aware, but because of my back am left with some damage in my leg and in my foot numbness and stuff erm which isn't that troublesome, but it's there, always aware of it, constant reminder.

Mr T has a clear, structured PA routine. He is now self-regulating his progress which shows a dramatic difference to his previous life experiences. Being in control and a sense of stability is most welcome.

> I don't go into the gym. Just use the pool. I swim a mile a day, urm come out of pool go into sauna sorry go into sauna first, then into pool and then er back into sauna and erm then into the jacuzzi, then when I come out of here and feel as if there is nothing wrong with me.

Mr T is able to self-manage his pain after a swimming session. He prefers being a regular swimmer and this has restored his self-pride.

> The pains gone. It's gone it's gone. And er, until obviously, I get reminded once I get out. I get reminded. Hardest bit in here is the bit here the bit where I come from the swimming pool to shower and to the locker. Standing here for that little bit longer feel it kicking in. Bend over, let it breath a bit and then you know I deal with it do you know what I mean.

Patsy experiences a negative cycle involving inactivity and weight gain, so getting her knees repaired is her priority, so that she can get more active and subsequently improve her quality of life and feel less restricted.

> Feel frustrated at the moment because it it does stop you erm exercising it does stop you doing what you like doing. I can't walk very far, longer time spent not exercising not walking the harder it is to get going again. When you can start walking, you are just not fit you get breathless the weight doesn't help, the weight is an enormous problem.

PA does not feature in Heidi's life, as just coping day-to-day is tough enough.

> "That's how I feel. That you haven't got any energy...and have to have a sleep in the afternoon because I am up all night".

3.5.6.3 Future PA intentions.

Heidi had a dance class that she was looking forward to; however, other peoples' needs, especially her children's needs, would take precedence. She literally came alive whilst talking about dancing and her passion for music, but she was not sure of attending the class.

> Well, hopefully I start dance class in on the 14th just an hour every Saturday with my brother's wife that's a fiver, more money but my Mum and Dad paid that for me.

Linda G is reflectively cautious about her commitment to exercising at the gym. Her level of self-awareness is enough to keep the experience healthy, as she intends to now look after herself.

> "Carry on. Carry on with what I am doing. As I said to you earlier, I have got to be careful that I don't cause I do overdo it".

Max resigned herself to being sedentary, adamant that without the knee operation she would be unable to participate in PA. The suggestion to doing PA at a gym, fuelled her frustration and anger about the situation.

> Would like to have some PA but can't see it happening, I am not going to. I shuffle when I walk just getting by is hard enough without doing nothing else. Would love to be mobile don't get me wrong, unless they give me the knees, not going to happen.

Pol seeks the opportunity to be active and intends to continue where possible and acknowledges that she could be more active, self-critical, and conscious of her integrity.

> Really would like to get back to gently doing something but erm I am active at work, don't sit down all day, walking backwards and forwards and around where I do work... Erm I would like to be fitter. (laughing) Definitely would, need to lose the weight. I notice it and thinking, really need to start doing something. Have had the winter and get less motivated don't you, so, so hopefully. I need to do something, doing line dancing, that's not really enough.

Pol would consider re-engaging in AOR if that were possible.

> "Think that will be the next step is saying to the doctor can you re-refer me again and go back again".

Mr T has identified a goal to achieve and is setting himself a path to for success. He is investing time and energy to see positive results and is keen to invest in the process wholeheartedly. He was determined and confidently spoke of his specific, measurable, and timely goal.

> What is my intention? I will tell you now. I swim 8 miles a week. My intention is to swim 15 mile a week, so every month I put a challenge to myself, I do 80 lengths now. So like yesterday sorry day before like I add 10 every month. So by the time Christmas comes I am doing two and half miles. I have put that as one of my goals.

Even although Patsy openly despised the gym, her intention is to return. There is a sense of urgency and she strongly intends to return to an alternative exercising environment that she considers supportive, rather than attending the gym available on AOR.

> “Soon as I can get back to gym”.

Dav has bouts of utter despair and fluctuates between total withdrawal from life and considering re-engagement. Dav's needs are delicate and it takes a significant amount of courage for him to trust others to help him, requiring genuine support and conversation to overcome his ambivalence about being physically active again. He has an underlying hope to be able to break the wall of isolation previously required for self-preservation.

> Do you know what, to be totally honest with you I have not got any plans. I sound like a sad sack don't I. But erm. ... In my head, I have not got any plans. In my head I have not got no plans. I am sitting off like an idiot. I am not doing nothing for myself. There are things I could be doing things for myself, (i.e. going to gym and getting out in the wheelchair). Just people seeing me in that chair, just Arghh, arh it makes me rage honestly, horrible. ... But erm, you say that gym has been refurbished I might actually go and see her again actually.

3.5.6.4 PA summary.

With regard to the themes of perception of PA and current and future intentions, the participants openly spoke about their fears and impact of PA on their current physical and mental conditions. Individuals were able to give examples of activities that may be more appropriate in comparison to attending a gym, with water-based exercises being a popular choice for alleviating pain. Whilst there was mention of unsupervised PA, which could cause harm either through excessive behaviour and/or through injury, there was a divergence of opinions regarding the value of being physically active: some individuals showed the

awareness of the health benefits of PA, while other recalled past negative examples to explain why PA was not appropriate for them. Fun and enjoyment and currently experienced positive health outcomes seemed to be the positive factors encouraging engagement in the activities. Even those that totally disregarded the AOR conveyed their desire to be more active during daily living in some way. The next section includes the personal reflection in the context of physical and mental health, social integration, and perceived quality of life.

3.5.7 Self.

3.5.7.1 Physical.

Physical health concerns were expressed by participants when exploring the lived experience of attending AOR.

Dav is obviously in pain from the extent of sweating during the interview and the need to move to release tensions.

> "Erm, I am in pain constantly...makes it a lot worse...the pain is erm horrendous".

Dav is worried about the impact of PA in the presence of current pain.

> When I am in the pool it hurts. It's when I get out of the pool. But I think when you do circuits then next morning. I was in my normal pain I was in my normal pain but I had that pain on top. Used muscles that you never knew you had. You know I got out of the pool and I was like oh my goodness, could hardly walk.

Linda G fights her physical challenges and now has an outlet to channel frustrations that arise, not wanting to accept limitations.

> "I can't admit, I am not disabled as far as I am concerned, although I am as far as for the actual physical condition".

Max stated what the researcher could see. The new bed was delivered during the interview, suggesting a temptation to let it all go and give up on the fight for her mobility. It is a battle for her.

> See that's another thing, got to have a new bed because where the knees so gone, sitting down I have to lie down sometimes. Because done something to circulation. You know where you get pins and needles and then cramp, mine bypass pins and needles and go straight into cramp.

Mr T is dependent on his scooter for mobility and accepts his situation.

> "Like that scooter I've got out there, that's that's so important to me, that is my legs".

3.5.7.2 Mental.

Mental health can be a barrier to engagement in a physical activity programme.

Dav can be down to the point of hoping that it will all just go away. When experiencing that amount of pain, hiding under the duvet might feel like a good option.

> When you don't feel like it, you don't want to do anything. ... You just feel, just want to wake up honestly there have been days where I have woke up and just thought just want to put quilt over my head.

Linda G is passionate about the gym now, having re-engaged after six weeks. Her natural self-drive and reconnection to youth and past ice-skating experiences are obviously positive.

> Yes, they said as well, you have really strong legs, I have the heart trainer up really high. And er I am one of those people who always has to be the best, not the best but at the top.

Linda G is open about the health benefits and the improvement in mental health she has experienced since attending the gym.

> Much happier, much, I am still lonely but I can deal with it. I couldn't deal with it before. It was dark and cold and you know I knew I was getting fatter and fatter shouldn't have, just couldn't do anything about it.

Life challenges have been so extreme that Mr T has considered ending his life. He now feels he has a reason to live and is positively channelling his energy into things that make him feel good.

> You know because I was so depressed. That you know it's it's it was terrible. You know, I was you know I was going to take my own life to be honest. ... Really and truly second chance for me to start second chance. Not everybody gets a second chance. I have got a second chance.

3.5.7.3 Social.

Social interaction at the gym can be either a positive or a negative experience for some.

Linda G expressed how the gym environment provided a sense of community of support that was missing in her life.

> "Totally and utterly on my own, being able to come here, even if you don't speak to anybody in there, you know there is somebody there if my heart starts fluttering you know someone is here..."

External conditions that others may enjoy present huge challenges that tend to alienate Dav from society. This creates a sense of feeling trapped indoors and missing out.

> Erm remember when we had that lovely weather really lovely weather, well it was horrible weather because I couldn't go out in the wheelchair when I did go out in the wheelchair I was sweating like. It's all erm, I am in for a hard time but, that gym just wasn't right for me.

Heidi struggles when with others and the thought of going to a gym is unrealistic. The impact could have been very detrimental; alternatively, she may have connected with others who experienced life in the same way.

> "Just get frustrated people do my head in. If I went to the gym again I'd be I don't know what I'd be doing anyway. Because I panic so much. My heart's always pounding".

Pol is concerned about how others perceive her and is a role model inspiring others.

> Want to take care of myself ... It's something that I do, I work helping people. Erm work with mental health. So it's about motivating those people as well. So it's there you know. How can you motivate people if you don't motivate yourself?

3.5.7.4 Quality of Life.

Dav's life is limited because of mobility and the challenge of being confined to a wheelchair. The effect of this physical limitation has closed down Dav's world.

> As you might tell from the sweating. Erm. But when I erm, just put washing out (yep) on the line. And it's just really hurt me. Erm So no no when I go out. When I go out I go out in the wheelchair. I couldn't walk from here to the shops down the road there.

Nevertheless, Dav is still determined to find some positive energy and he wishes to improve his quality of life.

> "Yeah, I have (space) to do something to get my life ... back, because I have got a lot to give".

Heidi shared the depth of despair and magnitude of personal challenges that arise without warning. Life is volatile and unpredictable for her. This must be very challenging when others depend upon you. Heidi seems afraid of life, despite experiencing a full, vibrant life before. Perhaps this is the consequence of it being too fast, too quick.

> I have never been a priority I am not my kids are my priority. Even though sometimes you know I don't want to be here. That's because I get really suicidal and I hate it, that's not me if I had the bottle I'd do it, but I don't know take every day as it comes now. Hate making appointments. You know what I mean. Cause things happen.

Max is proactive in receiving massage therapy that enables her to sleep. This is worth the effort to get there because of the enhanced rest – a temporary release of pain and positive impact on her daily life experience.

> "Go and have massage in my legs and in my back, bit painful but makes it more comfortable for the rest of the week. Can have a sleep and all that cause it gets your flow going".

Patsy has experienced many personal changes to her lifestyle from manic working and being constantly on-the-go to a sedentary lifestyle where everything has caught up with her. She was not aware of triggers and lifestyle factors leading to diabetes, so she now feels annoyed that she is suffering and having to monitor her health, dealing with the factors retrospectively. She is keen to be engaged in dealing with her health needs and is now proactive in practical ways to be habitually physically active.

> "So I thought maybe, if I did a lot more exercise maybe nip about a bit more, not sit down so much that would make difference".

3.5.7.5 Self summary.

Within the super-ordinate theme of self, the individuals articulated concerns about their physical and mental health, their social needs, and current quality of life. Physical pain is debilitating and is often the determinant of lifestyle choices, and mental health disorders seemed to both isolate them and provide an addictive focus for activities, often accompanied with a reflective awareness of the individual and the damaging consequences of mental health challenges.

Socially, the gym environment was seen as a positive and negative experience in many of the cases presented in this theme and individuals seemed to makes choices that would enhance the quality of their life and of others around them. Relationships with health professionals, fitness professionals, and friends/family are highlighted in the next section.

3.5.8 Relationships with others.

3.5.8.1 Health professionals.

Dav is fed up with not being heard. He expects a level of compassion and the health professional to support the journey step-by-step, rather than just jumping in.

> "Erm and all she keeps saying to me is get in the pool. Get in the pool. Get in the pool. She hasn't got a clue cause getting into the pool really hurts".

Unexpected advice can be unsettling and results in Dav questioning the understanding of the professional. Dav was surprised that AOR was even raised as a suggestion.

> ... if there is something wrong with me like if I need cream or something like that he'll give me them you know, we have got brilliant relationship with him. Been with the surgery for about 28 years ... actually referral took me back a bit.

Max feels that she has a problem with health professionals and that she is being fobbed by them. She feels unvalued within her already distressing situation. In a target-driven health environment, she feels like a burden to the system.

> "Just to get me off their back".

3.5.8.2 Fitness professionals.

Linda G was eager to share the experience of the supportive service that she received from the fitness professional. It settled her insecurities and was the catalyst to re-engagement, although it did seem to occur by chance.

> I can come in and talk to her, erm she doesn't know anything about that. She doesn't know that I was depressed... I think it is having someone who's ... don't know how you say it really is just caring and sort of wants to help, I mean she is the sort of person that she just like I said earlier who if disabled, if they are hugely obese or anorexic if they have got any problems she will help them. I think that's the, you wouldn't expect to find someone like that at gym, would you ... Erm she is almost like a I mean she'd made a fantastic nurse ... Making you feel comfortable. Making you feel that you are part of it. Nobody is going to laugh ... because you are older.

The persistent phone calls from the leisure centre were not welcomed by Dav but rather made him resistant towards engaging in the scheme. Although the intention was to encourage him to attend, the contact created barriers and ultimately discord, as he felt that he was not being listened to and that his needs would therefore not be met.

> "Yeah but keep hassling me people in gym. They are on your case".

3.5.8.3 Family, friends, and others.

Dav expressed his gratitude for the support from some of his family members and the expectation that he would be on his own dealing with the grief. This was one of his motivations to live.

> "Mum and me Mam. I actually had a slap off my mum for not getting in the wheelchair she was right too and the fact that my partner stayed, I didn't expect that".

Dav also openly expressed his need to process anger arising because of others' inappropriate reactions.

> "She was so ****** off with me ... excuse the language but she was so ... with me for being in a wheelchair. You get uneducated people like that".

Additionally, Dav feels a sense of shame and this makes him step back from connections prior to the bike crash.

> "...erm haven't been home".

Max was grateful for the support of even younger members of the family and feels frustrated that she is unable to join in during family activities; she is restricted to observe rather than participate in family activities and this is inhibiting her from connecting with people she loves.

> "They know what I can and can't do. Like they sit here and say come on Nanny I help you".

Although Max was concerned about people's perception of her physical inactivity, she chose not to do anything and this is upsetting.

> "People look at you and think you are lazy".

Max's inability to contribute to family life, as she would like to, is distressing.

> "I am just sitting here waiting for your time, what can you do, you are a burden on your family".

Additionally, Max shared her concerns about AOR being so public and the embarrassment of being out of her comfort zone, disclosing the disparity she perceived between herself and others in the gym environment.

> ... so I was going to do it, booked it all up, thought about it, not going to put myself through that, don't mind doing something a bit different but not so public in front of everyone, they said it's not but it's obvious it's a gym. Will be there with all able body people and there's you struggling. Wasn't up for that.

Heidi is extremely open about the importance of her family and children in her life. She feels personally out of control and was able to depend upon her family network for a support system.

> "... if it weren't for my family I don't know what I'd do. The doctors just give you more pills. Half the time I feel out of my face. I look out of my face".

3.5.8.4 Relationships with others.

Individuals that spoke about the relationships with others as positive when they were understood, classified the relationships as helpful, whereas judgements from others and lack of understanding induced a sense of withdrawal and resistance. The final section includes behaviour change talk identified within the narrative.

3.5.9 Behaviour change talk.

During the interviews, individuals spoke of reasons for changing their PA behaviour, reasons for not changing their PA behaviour, and the degree of ambivalence with regard to PA.

3.5.9.1 For.

Participants shared positive reasons behind being physically active in their own world view.

Linda G proudly shares the discrepancy in the PA levels before and now.

> "... you know but when I first started, no way I could have done that amount of time".

Strength of character can be heard in Mr T's expression.

> To be labelled like that was mentally destroying. I didn't want to go on anti-depressants. Refused all antidepressants. And then this year January, when I decided to do the swimming was in err November... That was time I got that low, your body tells you more or less. It more or less says to ya you'd better do something about yourself.

Mr T is happy with the speed of change and the benefits that he has experienced. Self-management helps Mr T maintain some self-pride and respect. He is able to fix his own problems when given the opportunity.

> If you would have met me in September November you know see how much change, even last year. ... Nobody going to change anything in my life. The only one that could change it is myself. Tablets for this tablets for that. I always like to be in control.

Patsy shared about the negative spiral that was taking over her life. She became aware and fear sparked her into action to do something about it. She now prioritised and valued investing time and energy into addressing health needs for her future quality of life.

> ... could see it was going down this road, big alarm bells going off I didn't escape and I wasn't aware the shape would be a contributory factor, wasn't aware lack of sleep lack, lack of exercise didn't recognise any of this.

Even through Patsy is classified as an AOR non-attendee, her initial intentions were strong. She was convinced of the benefits and unexpectedly willing to invest in AOR.

> Yes, because you could see the common sense of doing it. Can see the purpose of it and if you can see the purpose and can see the benefits seems bit of a no brainer really you are going to try and do it and that's what I did.

3.5.9.2 Against.

Heidi clearly stated she is not ready to change, having been referred to AOR.

> "... I am just not ready for it".

3.5.9.3 Ambivalence.

Dav shared his ambivalence, providing both reasons for and against PA behaviour change, detailing concerns and perceived barriers; this is normal for behaviour change. Potentially, with support this could evolve into change talk.

> And over the years, I have been shifting my weight over onto this leg (Slaps leg). Which has caused me back. So (ok) so I've had to get physio (yep). Erm and all she keeps saying to me is get in the pool. Get in the pool. Get in the pool. She hasn't got a clue cause getting into the pool really hurts ... exercising and er pain can be a killer you know.

Dav considers returning to AOR and takes responsibility for his actions to date and expects consequences, suggesting an element of respect for the AOR scheme and acceptance of his choices.

> "But, I think what they will say now, wouldn't blame them, if they take my card of me and I'll have to pay full whack".

Subtle change talk was heard during the interview with Dav.

> "Yeah, I have, I do have horrendous scarring but do you know what I am starting to come around now to thinking you know what to hell with other people".

Life experiences have also changed Dav's perception of PA. His desire to be physically active was evident, and during the member check, he mentioned he would be keen to purchase an exercise bike.

> On exercise bike it don't put no pressure. I didn't know that until I had physio about 2 weeks ago. So erm, when he first when he first said go to the gym I thought what on earth are you talking about. But when I used these exercise bikes in the physio, I thought yeah, that must have been was what he was talking about.

Behaviour change is possible and Dav expressed his muddled intentions to adopt actual behaviour change.

> Loads of people there, loads of people. But erm I paid once once I get over my blues, once I am back in the sky I think erm I once the weather ... I will be using the gym, I will ask if the doctor will refer me again I think that if that is possible ... Thinking of phoning them, that I won't be using. Got to sort my head out first. Mean that literally, before I go.

3.5.9.4 Behaviour change talk.

Individuals communicated how the behaviour change process has evolved, and the differences in quality of life once engaged in PA are positively highlighted. PA change talk was explicitly heard from participants that were pre-contemplative, although ambivalence demonstrating the reality of both pros and cons of change were identified and shared. In addition, a clear statement of discord was

prevalent. The key messages are now summarised after the interpretative analysis of the non-adhering participant interviews.

3.5.10 Key messages of non-adhering AOR participants.

The individuals interviewed in this study expressed their lived experience of AOR and their specific reasons for non-adherence. Although this study did not intend to combine the individuals' lived experiences into a single statement, any convergence across the cases was noted to help improve the participant adherence rate for AOR. The aim of AOR was correctly understood by non-adhering participants, but the medical referral to the PA intervention was experienced differently. A key reason behind non-adherence to AOR was the individual needs not being understood by the health and/or fitness professional and dissociation with the gym environment. With regard to each individual's experience of AOR, being listened to, receiving support during the behaviour change, and having an opportunity to re-engage in the scheme were considered positive elements. Increasing PA levels was not viewed as a positive behaviour change by all, although alternative options of more appropriate activities were suggested. The myriad of perceptions about PA were built on past experiences and future expectations. Nevertheless, individuals could relate to the benefits of an active lifestyle for an enhanced quality of life. The individuals' self-awareness and personal reflection was focused either on the problems related to performing PA or enhancement of current health conditions. Within the narratives, acceptance of themselves and by others seemed to resonate as a positive contributor to change and this was articulated through an array of change talk.

3.6 Discussion

This study aimed to collect robust, rich data of the lived experience for those referred to a PA intervention to make up for less superficial qualitative studies (Williams *et al.,* 2007) by providing methodological detail (Section 3.4) and including the processes used to enhance trustworthiness (Section 3.4.4). The researcher was acknowledged as the primary analytical instrument (Fade, 2004, p. 2) and the non-adhering participants gave an account of their experience. Ultimately, the aim was to understand the experience of non-adhering participants so that the underlying issues can be interpreted to enhance practice (Reid *et al.,* 2005). On analysing the non-attendees' accounts of their lived experience, it is hoped that a more effective referral scheme is developed to better meet their needs, potentially enhancing adherence to AOR. The super ordinate themes (Section 3.5.10) included the referral process, the individual, PA itself, relationship to others, and perception of change. There was little reference to time as a major barrier during the interviews unlike in previous studies (Sports Council and Health Education Authority, 1992; National Health Service, 2007), probably because in this qualitative research, the participants could clearly express the reasons behind their non-adherence. However, as reported two decades ago (Health Education Authority, 1992), physical, emotional, and motivational concerns were expressed.

The following recommendations are made from the IPA for non-adhering participants. The AOR process would be improved if the referral was appropriate as specified in the NQAF guidelines (Department for Health, 2001). Once the referral had been discussed with the health professional and patient, the induction experience should be welcoming and thorough to ensure the participant needs are understood, enabling them to feel comfortable in the

environment. This was also suggested by Allender *et al.* (2006). This collaborative conversation between the health professional and patient would imply that the individual is guided to, rather than prescribed, AOR. Throughout the intervention, and especially at the induction, fitness professionals are encouraged to be engaged in the behaviour change process with the individual and to continue to provide support and guidance, as recommended in the Halisham study (Taylor *et al.,* 1998), e.g. physical concerns such as Max's knees and Dav's back could be addressed by trained staff. Additionally, mental health needs expressed by Heidi and Mr T may need to be addressed prior to the physical referral. Social integration may help the individual feel part of the environment and this could be achieved by the interaction with fitness professionals and other leisure centre users, as suggested by Hardcastle and Taylor (2001); however, it should be noted that this study was based on older women and social interaction was generally considered valuable by them. Morton *et al.* (2008) reported that using previous participants as peers to support new PARS participants enhanced relatedness, but this may not be appropriate for all participants, e.g. Dav resisted attending the gym perhaps because of loss of confidence and not accepting his physical condition, even though disabled men have reported PA to be a positive experience in their efforts to get back into social life (Robertson, 2003).

By understanding the individual's perception of PA, appropriate activity can be referred; this helps the individuals feel empowered and that they are able to choose what is best for them. Heidi clearly expressed her inclination towards dance, Mr T preferred to swim, and Patsy's preferred choice of PA was walking. Therefore, a wider choice of activities needs to be made available, as suggested by Wormald and Ingle (2004). The weather was an important factor for Linda G

and affordability was the reason why Mr T chose a private facility, akin to the two factors associated to sedentary behaviour by Salmon *et al.* (2003). Linda G's case exemplifies that adherence to AOR can be enhanced by making an appropriate phone call to re-engage once barriers such as injury and bad weather have passed. This was also noted in the Welsh PARS where it was stated that a third of all participants re-engaged if contacted within four weeks of induction (Murphy *et al.,* 2010).

The common theme arising with regard to the relationship with professionals and receiving support was that of the participants wanting to be heard. This is something that was not reported in previous surveys (Sports Council and Health Education Authority, 1992; NHS, 2009). Dav, Heidi, and Max felt they were not listened to. Mr T had lost faith in the system and Patsy was disappointed with the level of care she received from fitness professionals at the referral leisure centre. On the other hand, Linda was very happy with the relationship she shared with the fitness professional and the level of service provided at the second induction, and Poll had no complaints, so for these two individuals, the relationship with the health/fitness professional was not considered the barrier to adherence to the PA intervention.

One of the key elements throughout this study was the individuality of the perspective which if met could encourage engagement in a PARS. In this study, this was found via IPA – an ideographic methodology (Smith *et al.,* 2011). The engagement in the referral process may be the first step to actual PA behaviour change. In addressing the key elements highlighted above, adherence to PARS may increase. From the participants interviewed, five out of seven perceived AOR to be a positive opportunity for appropriate referrals; this was a higher

proportion of positive attitude towards the PARS than that in a previous study, an unexpected outcome from this study (Taylor *et al.,* 1998). However, it is difficult to compare outcomes because of missing details in later studies that quantified a "positive experience".

Rather than measureable outcomes such as PA levels, especially for participants that do not adhere to PARS and hence who are not present to collect the information, a qualitative study enables data collection through relationship-building with the participants and by engaging them in the research process (Black, 1994). This approach helps one understand how to improve adherence to PARS at a local level, as suggested by Singh (1997). This qualitative study used a systematic transparent process to assess PARS effectiveness by asking non-adhering participants about their lived experience of the PA intervention and includes detail of the methods used for data collection and IPA analysis (Smith *et al.,* 2011) – these aspects are not explained in previously reported qualitative studies (Allender *et al.,* 2006). With the hope that future PARS reviews, unlike the most recent one by Pavey *et al.* (2011), include qualitative studies so that the patient's experience is part of the evaluation process as recommended in the NQAF (Department for Health, 2001) to ultimately provide a preventative, patient-centred, and productive service (NHS, 2009).

3.6.1 Positioning themes in a theoretical context.

Conducting studies on a real world intervention is a complex process (Dugdill *et al.,* 2005). However, this study attempts to reflect on the theoretical context of the non-adhering participants narratives that have been interpretatively

analysed, as mentioned above; of note, the study was originally not meant to be an inductive study.

Stages of change (Prochaska *et al.,* 1992) ranged from pre-contemplative for Heidi through to maintained behaviour change for Mr T and Linda G. Whilst change talk and evidence of preparation was non linearly heard throughout the interviews with varying levels of ambivalence, participants that shared commitment talk were more active and had clarity in their future PA intention (i.e. Mr T: "I will tell you now. I swim 8 miles a week. My intention is to swim 15 mile a week".). This observation was in line with the findings of Amrhein *et al.'s* (2003) study: the strength of commitment influences behaviour change. Regarding stages of change, relapse is expected when changing behaviour, even so, individuals had or intended to re-engage in PA (i.e. Linda & Pol).

Throughout the interview, individuals demonstrated the inherent desire to enhance their quality of life (SDT; Deci & Ryan, 1985) even when the service was unable to meet their needs (i.e. Max finding massage beneficial for her legs), so individuals explored other ways to have their needs met (i.e. Linda & Mr T). In terms of maintaining quality of life, individuals chose not to perform the behaviour in some cases because of the perceived outcomes (i.e. Dav/Max: PA = Pain). With relation to BPNT, all expressed a degree of expertise with their own condition, considered potential barriers, and had a clear sense of their competence regarding whether they could or could not perform the PA. Additionally, some individuals valued being with other like-minded people (relatedness) in similar situations. However, for some, their own isolation was an additional barrier to the behaviour change (Dav & Heidi). Autonomy, even though not in the desired direction for increase in PA, was highly evident in the

cases of these AOR participants because they had decided not to attend (Max, Heidi, Dav), find an alternative gym experience to meet their needs (Patsy, Mr T), or to re-engage when they were ready (Pol & Linda G). Individuals who expressed the positive aspects of a collaborative approach (i.e. dialogue with the health/fitness professional) seemed to value the AOR experience and were highly likely to engage in being active, even if it was not via the AOR leisure centre (e.g. Pol, Mr T, & Tricia).

3.6.2 Reflections on the research process.

It is necessary to reflect on the use of the IPA process (Smith *et al.*, 2011) to understand the lived experience of non-adhering AOR participants as part of the credibility checks of the study analysis. This reflection was part of the reflexive journal maintained throughout the study, which is considered imperative for validity, trustworthiness, and rigour of qualitative research (Rolfe, 2006) and "expected" for IPA (Smith *et al*., 2011, p.114). The structured process helped the researcher to explore the vast quantity of data and to systematically uncover the participants' meaning. Moreover, the member-checking process after analysis provided a sense of validation that the researcher's interpretation was appropriate. For the emerging researcher, learning through participants' lived experiences has been enjoyable and the researcher believes the evidence base for PARS would be enhanced if individuals are given a voice through qualitative studies. The processes used to apply rigour to the study including the expert checks, including the member checking, were invaluable to validate that the analysis was a true reflection of the data collected from non-adhering participants. Additionally, validation of the quality of the research process applied was achieved when this study was accepted in a peer-reviewed journal.

3.6.3 Research limitations.

Owing to the small sample size of this study, findings cannot be generalised to AOR in general, nor was it the intention of IPA used for this study which aims to understand an individuals' lived experience. The results can be regarded trustworthy, acknowledging that the lived experiences were unique to the individuals and were valid additions to the knowledge base of non-adherence during PARS. Additionally, different PA intervention designs (DH, 2001) may alter the participant lived experience, so the outcomes reported in this study cannot be applied to all PARS. Of note, the study used ethical sampling methods as per which individuals themselves chose to participate in the study, so there may a bias in the results in that some individuals may have used the research as an opportunity to complain about the services received. However, this was not evident within the narratives. Finally, the interviews were restricted to one hour because one researcher conducted the entire study, so this time limit could have potentially have restricted participants who may have wanted a longer discussions.

Chapter 4 A Comparison of the International Physical Activity Questionnaire and the General Practice Physical Activity Questionnaire (Study 3).

4.1 Measuring PA

The main measure of effectiveness of PARS is PA behaviour change (as discussed in section 2.3 of this thesis). Early epidemiological studies measured PA by occupation (Morris *et al.,* 1953), but now PA can be measured by duration, frequency, intensity, and circumstance (e.g. occupation and leisure; Montoye *et al.,* 1996). Sallis and Owen (1999) presented a PA and heath behavioural epidemiological study which involved developing methods for accurate measurement of PA. However, the absence of an internationally accepted PA measuring tool inhibits the comparison of PA outcomes from brief interventions and prevalence of inactivity across countries (Kurtze *et al.,* 2008). Laporte *et al.* (1985) stated more than 30 different methods could be used to measure PA, with variations in user technique: calorimetry (which can be direct and indirect), job classification, survey procedures, behavioural observation, and electrical and mechanical monitors (including metabolic analysers, physiological markers, and dietary measures).

Researchers are encouraged to produce precise PA measurements using the resources available (Prince *et al.,* 2008) and to select a tool that is valid, reliable, practical, and nonreactive in changing the participants behaviour

(Laporte *et al.,* 1985). The purpose of the PA intervention is also to be considered (Montoye *et al.,* 1996), e.g. if a PA intervention is delivered for reducing obesity, then energy expenditure might be objectively collected, whereas a study based on osteoporosis may collect data on weight-bearing activity. Additionally, the reason behind measuring PA levels may help determine which type of questionnaire is more suitable for a study; for example, a non-validated questionnaire such as the GPPAQ (Physical Activity Policy Health Improvement Directorate, 2009) may be suitable for screening during a PA intervention and a validated questionnaire such as the IPAQ (Anon., 2001) may be suitable for meta-analyses. A rigorous measure helps maintain the homogeneity of reported outcomes across studies and ensures research findings are translated to practical applications.

The outcome measure for PARS measuring energy expenditure or amount of work performed can be achieved objectively using tools such as doubly labelled water (DLW), accelerometers, and pedometers (Montoye *et al*., 1996). DLW measures carbon dioxide production for up to three weeks and is considered the gold standard for measuring energy expenditure. However, this method is expensive and requires the use of a complex ratio-mass spectrometer for analysis (Montoye *et al.,* 1996). Accelerometers measure the movement of limbs when they are accelerated in proportion to the muscular force and pedometers measure steps of PA. Both devices need to be worn by participant and they may not collect all PA details such as isometric muscle contraction (Montoye *et al.,* 1996). Subjective tools might also be used, such as diary logs, interviews, and questionnaires (Montoye *et al.,* 1996). Diary logs enable an individual or observer to monitor the type, frequency, and intensity of activity; however, the method may be inaccurate and tedious (Montoye *et al.,* 1996). Self-reporting

questionnaires were developed to measure large-scale population PA levels (Bauman *et al.,* 2009).

4.1.1 Self-reporting questionnaires.

Dishman (1994) highlights the challenges of developing effective PA interventions in the presence of the multitude of PA questionnaires currently available, i.e. IPAQ (Author, 2001), 7-Day Physical Activity Recall (PAR; Johnson-Kozlow *et al.,* 2006), Global Physical Activity Questionnaire (GPAQ; Bull *et al.,* 2009), and the recent single-item PA question (Milton *et al.,* 2011). In the case of self-reporting questionnaires, the timeframe available may determine the amount of data collected (Laporte *et al.,* 1985). Sahlqvist *et al.* (2011) reported that shorter personalised questionnaires which were 15 A4 pages long increased the response rates (OR = 1.48, 95% CI 1.06 to 2.07) and item non-response was 5.8% for the short questionnaire while it was 9.8% (p = 0.04) for the longer questionnaire which was 24 A4 pages long. The study also emphasised on the value of personalised survey reminder packs, as the response rate increased by almost 40% when reminder postcards were sent.

Self-reporting questionnaires require less training, financial resources, and technical knowledge than objective tools such pedometers and accelerometers. However, they should be used with caution (Sallis & Saelens, 2000), especially when assessing the effectiveness of interventions such as PARS (Rzewnicki *et al.,* 2003) because of the potential overestimation of self-reporting questionnaires. The results of self-reporting questionnaires have been found to not follow a trend when compared to directly measured PA levels (Hagstromer *et al.,* 2006) and thus it has been suggested that care should be taken when using

these results in systematic reviews and meta-analyses. Overestimation is not unique to the IPAQ questionnaire. Johnson-Kozlow *et al.* (2006) reported the 7-Day PAR to have superior validity to IPAQ when compared to an Actigraph accelerometer (ρ = 0.73 for PAR and ρ = 0.33 for IPAQ; $p < 0.001$). However, both measures overestimated the total PA, PAR by an average of 22 minutes and IPAQ by an average of 257 minutes more than that measured by the accelerometer; this may have been caused by individuals wishing to display socially desirable responses (Warnecke *et al.,* 1997). It is also recognised that appropriate cognition levels are required to be able to effectively complete self-reporting questionnaires (Baranowski, 1988) and Rzewnicki *et al.* (2003) reported that questionnaire administration training is thought to reduce the overestimation when using self-reporting IPAQ and pilot testing is recommended, especially when translating questionnaires (Bull, 2005b). Nevertheless, despite its practical limitations, the IPAQ was selected as the internationally validated self-reporting questionnaire for PA (Craig *et al*., 2003) that has been used for PA intervention studies (e.g. Bond *et al.*, 2006, Dinger *et al.*, 2007, & Araujo-Soares, 2009).

4.2 IPAQ

According to Biddle and Mutrie (2008), the IPAQ meets the need for a standardised self-reported PA measure. The IPAQ (Anon., 2001) is a validated self-reporting questionnaire used to measure PA behaviour change within PARS (Craig *et al.,* 2003; Hagstromer *et al.,* 2006). The estimate completion time for the long form with 27 items is 15–20 minutes. The questionnaire is available in a short form with seven items and an estimated completion time of three to four

minutes (Appendix B.4). The questionnaires can be self administered and administered by telephone; the participants are asked to recall the PA performed in the last seven days. The long form IPAQ measures PA including leisure time, domestic/gardening, work place, and transport-related activity whereas the short form IPAQ asks specifically about vigorous, moderate, and walking PA. It also measures the amount of time spent sitting, although this value is not included in the calculated IPAQ PA level.

4.2.1 Validity and reliability of IPAQ.

The validity and reliability of the IPAQ have been assessed (Craig *et al.,* 2003; Hagstromer *et al.,* 2006; Johnson-Kozlow *et al.,* 2006; Kurtze *et al.,* 2008; Prince *et al.,* 2008). The long form IPAQ has shown acceptable validity when assessing levels and patterns of PA in healthy adults and a strong positive relationship was observed between the IPAQ and activity monitor data for total PA ($\rho = 0.55$; $p < 0.001$); a significant correlation of the MET hours per day was found between the IPAQ and PA log book data ($\rho = 0.67$; $p < 0.001$; Hagstromer *et al.,* 2006). Practically, the short form questionnaire was preferred by both the administrator and participant (Craig *et al.,* 2003) because the questions in the long form seemed repetitive. The short form self-administered IPAQ was reported to be valid ($\rho = 0.75$) compared to the Computer Science and Application Inc. Accelerometer (model 7164) across 12 countries and is thought to be at least as good as other self-reporting measures and is recommended for monitoring of PA levels in large sample sizes because it is brief, flexible, and adaptable to different cultures (Craig *et al.,* 2003). Additionally, Kurtze *et al.* (2008) reported the validity of vigorous activity of the

short form IPAQ to show a moderate to strong correlation with the direct measure of aerobic power VO_2 max ($\rho = 0.41$; $p \leq 0.01$). Consequently, the IPAQ short form, both telephonic and self-administered forms, was the first validated tool used to assess prevalence of PA across a diverse range of 52746 participants aged 16–65 years across 20 countries; it was reported to be an acceptable surveillance instrument (Bauman *et al.,* 2009).

The IPAQ long and short form strengths were combined, the different domains for the long form and the brevity of the short form were used to create the GPAQ global surveillance self-reporting questionnaire (Bull *et al.,* 2009). The outcomes from IPAQ are both categorical and provide a continuous value of MET minutes/week of energy expenditure (Anon., 2001). MET is a method of estimating the amount of energy expended for a range of activities (Ainsworth *et al.,* 2000).

4.3 GPPAQ

The recent UK government PA guidelines "Be Active, Be Healthy" (DH, 2009) promote the use of the GPPAQ (Appendix D.1). It is the latest PA self-reporting screening tool for 16–74-year-olds, recommended to health professionals for patient PA level assessment (Bull & Milton, 2011). It is estimated to take a maximum of two minutes to complete (Physical Activity Policy Health Improvement Directorate, 2009).

The GPPAQ has three questions which measure occupational and general activity and walking PA. The general activity questions include questions on physical exercise, cycling, housework, gardening, walking, and walking speed. Because of

the over-inflation of the housework, gardening, and walking activities during the validation of the tool, these questionnaire outputs are not part of the PA level scoring.

The questionnaire has evolved from the European Prospective Investigation into Cancer and Nutrition (EPIC) study (Wareham *et al.,* 2002; Crust *et al.,* 2008). The GPPAQ has not been validated as a research tool, so it is not recommended to be used as a means of measuring effectiveness of PARS on its own (Physical Activity Policy Health Improvement Directorate, 2009).

4.3.1 Summary of IPAQ and GPPAQ.

The IPAQ is a validated questionnaire and the short form takes up to four minutes to complete compared to the GPPAQ which is used as a two-minute screening tool. The latter presents a 50% reduction in time for a health professional to assess PA of patients. The GPPAQ has been advocated as the screening tool for the latest PA care pathway, Let's Get Moving (Bull & Milton, 2010; 2011). However, the validation of the GPPAQ is limited. It has been piloted with a study of 61 participants and a follow-up study with 334 participants (Physical Activity Policy Health Improvement Directorate, 2009), whereas the IPAQ has been validated across 20 countries with a sample size of 52,746 (Bauman *et al.,* 2009). The practicality of the GPPAQ together with the validity of the IPAQ is desirable for a PA self-reporting questionnaire measuring PA change during PARS.

4.4 Aim and Objectives

4.4.1 Aim.

The aim of this study was to compare the PA outcome categories of the validated IPAQ and recommended GPPAQ screening tool.

4.4.2 Objectives.

- Compare completion rates of IPAQ and GPPAQ
- Compare the IPAQ and GPPAQ PA categorical levels
- Calculate the correlation co-efficient for IPAQ and GPPAQ PA levels

4.4.3 Hypothesis.

The null hypothesis of this study was:

H^o1: There will be no significant correlation between GPPAQ and IPAQ categorical levels.

4.5 Methods

4.5.1 Participants.

This study was conducted within the same timeframe and with the same population as in Chapter 2.6.1 (Study 2). A total of 2228 participants were inducted to AOR between October 2009 and September 2010 in Northamptonshire. Participant age, sex, and ethnicity were previously reported

in Chapter 2, 2.7.2 and 2.7.3. Participants reported IPAQ and GPPAQ PA levels at induction and 3, 6, and 12 months.

4.5.2 Data collection.

Fitness professionals from leisure centres (n = 15) across Northamptonshire were trained to use the self-administered IPAQ short form and GPPAQ.

The IPAQ and GPPAQ were administered by fitness professionals during the induction to the leisure centre and at the exit interview. Follow-up IPAQ and GPPAQ questionnaires were sent to all consenting participants at 6 and 12 months after exit.

4.5.3 Data cleansing.

Walking time, moderate and vigorous, exceeding 180 minutes were truncated to equal 180 minutes, as detailed in IPAQ scoring guidance (Anon., 2005) to reduce over-reporting. In addition, the IPAQ level was not calculated because of missing data within the vigorous and/or moderate walking questions, as recommended in the IPAQ scoring protocol (Anon., 2005).

4.5.4 Data coding.

The IPAQ and GPPAQ data from induction and 3, 6, and 12 months were collated into one spreadsheet. The IPAQ and GPPAQ data were coded into PA levels and transferred to SPSS (Version 17) for analysis. The nominal data categories for the IPAQ and GPPAQ are defined below.

4.5.4.1 IPAQ coding.

The time in minutes spent on each type of activity was recorded and converted to MET values. An average MET value was derived from Ainsworth *et al.* (2000) MET compendium: 3.3 MET for walking, 4 MET for moderate PA, and 8 MET for vigorous activity. The intensity MET values were then summed to yield a total MET minutes/week to be calculated and coded to a PA level (Craig *et al.,* 2003).

The IPAQ scores can be categorised into the following levels: low, moderate, and high (Anon., 2005).

Category 1: Low - The lowest level of PA. Individuals who did not meet criteria for categories 2 or 3 were considered inactive.

Category 2: Moderate - Any one of the following 3 criteria:

• 3 or more days of vigorous activity of at least 20 minutes/day OR

• 5 or more days of moderate-intensity activity or walking of at least 30 minutes/day OR 5 or more days of any combination of walking, moderate-intensity, or vigorous-intensity activities, achieving a minimum of at least 600 MET minutes/week

Category 3: High - Any one of the following 2 criteria:

• Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week OR 7 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities, achieving a minimum of at least 3000 MET minutes/week

4.5.4.2 GPPAQ coding.

The GPPAQ PA index labels are calculated using occupational PA and combined physical exercise and cycling answers as seen in Figure 4.1 and Figure 4.2 (Physical Activity Policy Health Improvement Directorate, 2009).

Cycling / Physical Exercise	**0**	**Some but < 1**	**1-2.9**	**≥3**
0	0	Some but < 1	1-2.9	≥3
Some but < 1	Some but < 1	1-2.9	≥3	≥3
1-2.9	1-2.9	≥3	≥3	≥3
≥3	≥3	≥3	≥3	≥3

Figure 4.1. Combined physical exercise and cycling (Physical Activity Policy Health Improvement Directorate, 2009)

	Occupation			
Physical exercise and / or cycling (hr/wk)	Sedentary	Standing	Physical	Heavy Manual
0	Inactive	Moderately Inactive	Moderately Active	Active
Some but < 1	Moderately Inactive	Moderately Active	Active	Active
1-2.9	Moderately Active	Active	Active	Active
≥ 3	Active	Active	Active	Active

Figure 4.2. Calculation of GPPAQ PA level; occupational PA and combined physical exercise and cycling (Physical Activity Policy Health Improvement Directorate, 2009).

The categories for GPPAQ are inactive, moderately inactive, moderately active, and active (Physical Activity Policy Health Improvement Directorate, 2009).

4.5.5 Data analysis.

The IPAQ and GPPAQ data were compared by a number of PA levels. The IPAQ and GPPAQ self-reported PA levels were cross-tabulated. A 3 × 4 Pearson Chi-square (X^2) test was performed to determine whether there was a significant relationship between the IPAQ and GPPAQ levels because there were three categorical levels for the IPAQ (low, moderate, and high) and four categorical levels for the GPPAQ (inactive, moderately inactive, moderately active, and active). Alpha (α) was set at 0.05 for 95% confidence. Cramer's V was calculated to measure the strength of association between the two categorical variables.

4.6 Results

4.6.1 IPAQ and GPPAQ data.

In all, 2760 (31%) IPAQ levels and 3102 (35%) GPPAQ levels were reported from a potential 8912 entries of IPAQ and GPPAQ data; participants had completed the questionnaires at induction, exit and 6 and 12 months; 2621 (29%) IPAQ and GPPAQ questionnaires were completed at the same time point to enable comparison of PA levels.

4.6.2 Frequency of IPAQ and GPPAQ PA levels.

Frequency counts of IPAQ PA levels and GPPAQ PA levels are reported in (Table 4.1 and 4.2, respectively; 39% of all IPAQ levels were low, 35%, moderate, and 26%, high; 46% of all GPPAQ levels were inactive, 16%, moderately inactive,

18%, moderately active, and 20%, active. The combined moderate GPPAQ levels were 34%.

Table 4.1

IPAQ PA categories (n = 2760)

IPAQ PA level	Frequency	%
Low (1)	1070	39
Moderate (2)	973	35
High (3)	717	26

Table 4.2

GPPAQ PA categories (n = 3102)

GPPAQ PA level	Frequency	%
Inactive (1)	1421	46
Moderately Inactive (2)	485	16
Moderately Active (3)	562	18
Active (4)	634	20

The median IPAQ level (n = 2760) was 2.00 +/-0.80, equal to moderate. The median GPPAQ level (n = 3102) was 2.00 +/-1.20, equal to moderately inactive.

4.6.3 Cross-tabulation of GPPAQ and IPAQ.

Table 4.3 shows the cross-tabulation of GPPAQ and IPAQ PA levels. The three levels for IPAQ, low, moderate, and high were cross-tabulated to the four levels of GPPAQ, inactive, moderately inactive, moderately active, and active.

Table 4.3

Cross tabulation of IPAQ and GPPAQ levels (n = 2621)

GPPAQ Category	**IPAQ Category**			
	Low	Moderate	High	Total
Inactive	665	399	138	1202
Moderately Inactive	195	157	64	416
Moderately Active	125	198	148	471
Active	50	166	316	532
TOTAL	1035	920	666	2621

It can be seen that 50 participants reported they were active on the GPPAQ but were low on the IPAQ, and 138 participants reported they were high on the IPAQ and inactive on the GPPAQ.

4.6.4 Chi-square (X^2) analysis.

GPPAQ and IPAQ Chi-square (X^2) value was 591.69 with an associated probability of $p < 0.001$, DF = 6. Cramer's V was 0.34, so 11% variation of frequencies of IPAQ can be explained by GPPAQ. Therefore, there is a significantly weak association between IPAQ and GPPAQ.

4.7 Discussion

Self-reporting PA questionnaires remain the most widely used type of PA measure (Sallis & Saelens, 2000) despite their limitations, e.g. social desirability (Warnecke *et al.,* 1997) and the cognitive challenge of recalling previous physical activities (Baranowski, 1988). However, part of the process in understanding PA interventions is being able to accurately measure PA levels (Sallis & Owen, 1999) and the IPAQ is an internationally validated (Craig *et al.,* 2003) extensively used (Bauman *et al.,* 2009) self-reporting PA questionnaire. This study aimed to compare a new screening tool (GPPAQ; Bull & Milton, 2011), with the IPAQ, to assess the applicability of a quicker self-reporting questionnaire that potentially requires less cognition and detail in the recall of PA (i.e. types of activity rather than self-determined intensity of activity conducted), to enhance completion rates (Sahlqvist *et al.*, 2011) and to test the applicability of the new GPPAQ, currently recommended as a screening tool, prior to it being misused as a PA evaluation measure.

In this study, a slightly higher number of GPPAQ forms than IPAQ forms was completed (Section 4.6.1), probably because of the questionnaire taking less time to complete (Sahlqvist *et al.,* 2011). Hence, local evaluation teams may be tempted to use a questionnaire that has a higher response rate to gain local community knowledge, as pointed out by Singh (1997). However, as this is the

first known reported study to compare the IPAQ and GPPAQ categorical outcomes, the weak correlation between the two PA self-reporting questionnaires provides little confidence in using the screening tool to measure PA behaviour change during PA interventions. The null hypothesis for this study is rejected as the GPPAQ and IPAQ questionnaires produced a significantly weak correlation, meaning the association was unlikely to have arisen because of sampling error. However, the weak correlation between the GPPAQ to IPAQ shows that the GPPAQ should not be used as a replacement for the IPAQ when evaluating a PA intervention, regardless of the additional resources required, considering the financial investment in PARS (Section 2.3.4.). Moreover, if practical conditions allow, the use of objective measures (i.e. accelerometers, double-labelled water) may enhance the reliability/validity of the future PA research.

The GPPAQ is endorsed as a screening tool for PA interventions and may support health/fitness professionals to engage a patient in an initial conversation regarding their PA behaviour. The questionnaire could be developed to include walking activity in the coding of the PA level, as this type of PA may be an effective starting point for a sedentary individual (Wannamethee & Shaper, 2001).

Regarding the categorical label outcomes, the total median PA levels for both the IPAQ and GPPAQ were moderate, suggesting the self-reporting questionnaires produce the same categorical value. However, when comparing the two questionnaires, it could be questioned whether the IPAQ moderate label includes both moderately inactive and moderately active PA label of the GPPAQ or if the IPAQ low label includes inactive and moderately inactive GPPAQ PA categorical

values. Another observation of the reported data was that extreme values were reported of active on one self-reporting questionnaire and inactive on the other (Table 4.3), probably because of questionnaire comprehension and expected over-estimation when using an IPAQ self-reporting measure (Rzewnicki *et al.,* 2003). Although over-estimation may be ruled out in a repeated-measures study, an individual may perceive that PA increases are expected and the individual would wish to demonstrate socially desirable behaviour (Warnecke *et al.,* 1997). Additionally, when using the GPPAQ during study 3, MET minutes/week values (Ainsworth *et al.,* 2000) could not be accurately calculated to provide continuous data as the activities were not recorded for a specific amount of time, supporting the rationale behind the use of the IPAQ for Study 1 and 4 to measure PA levels with self-reporting questionnaires, so that the actual amount of PA is measured rather than categories of time, as the GPPAQ may not record a change in level if the participant remains in the same category.

Findings from this study should discourage misuse of the GPPAQ as an evaluation PA measure for PARS. Moreover, a gold standard PA self-reporting measuring tool is still required rather than the diverse choices currently available. This would enable comparative PA intervention studies to use an accurate PA measure to produce results that can be synthesised into a meta-analysis to gain a better understanding of the effectiveness of PARS.

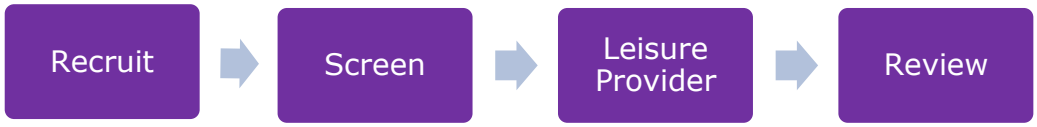
Chapter 5 Adherence and PA Behaviour Change during PARS with MI (Study 4).

5.1 Let's Get Moving

PA interventions proliferating the UK within primary care have included direct advice giving (Hillsdon *et al.,* 2002), PA counselling (Elley *et al.,* 2003), information giving (Smith *et al.,* 2000), and exercise referral schemes (Williams *et al.,* 2007). McKay *et al.* (2003, p.98) suggested, "The importance of physical activity is proven and methods implementing exercise programmes should be urgently researched", highlighting the importance of understanding how the schemes are conducted as well as the pathway of PARS (Dugdill *et al.,* 2005). Chapter 2 (Study 1) stated that low-adherence rates are a matter of concern for PARS (Gidlow, 2005) and the long-term effectiveness of the PA interventions on health outcomes (Pavey *et al.,* 2011) remains unknown. PA level increases are maintained in the long term for some participants (Chapter 2) and adherence to PARS is thought to increase PA levels at least in the short term (Williams *et al.,* 2007). Although not generalisable, the lived experience of non-adhering participants reported in Chapter 3 (Study 2) showed that the type of activity available and/or induction experiences were barriers to attending the scheme in Northamptonshire.

AOR was decommissioned across Northamptonshire in March 2010 owing to the reduction in public health budget and reported low attendance rates (Chapter 2), thus creating a gap in the provision of public services to support individuals to increase PA. The LGM care pathway, as seen in Figure 5.1, was developed by DH

in 2007 and at the time of this research was the latest recommended PA referral intervention in UK policy for a preventative, people-centred, and productive health service (NHS, 2009). It is a systematic approach to integrate PA into primary care for all inactive patients and includes five linear stages: Recruitment, screening, brief intervention (BI) which includes adapted motivational interviewing (AMI) to discuss the importance and confidence levels associated with performing PA, active participation, and review (Bull & Milton, 2011). Patients are screened by health professionals using the GPPAQ (Chapter 4) and referred if their self-reported PA index is inactive, moderately inactive, or moderately active. The BI is required to be delivered by competent MI practitioners and is proposed to elicit readiness for change via reflective listening (Bull & Milton, 2010). The patient is signposted to appropriate physical activities and active reviews are conducted at 3, 6, and 9 months. The main difference between AOR (Chapter 2) and LGM is the BI of MI and the subsequent choice of PA available to the patient (see Figure 5.1 for comparison).



Stages of AOR

Stages of LGM

Figure 5.1. Stages of AOR and LGM PARS.

At the time of this study, there were no other known published studies on PA behaviour change and participants' adherence to LGM. Published studies relating to LGM were feasibility studies only, which recommended future research studies to investigate PA adherence and PA behaviour change during the intervention (Bull *et al.,* 2008).

In the initial LGM feasibility trial, high-risk patients were directed to an exercise referral scheme and medium/low-risk patients to local physical activities (Bull *et al.,* 2008). Bull *et al.* (2008) reported the phases of the trial as wave one and wave two. Wave one of the feasibility study was conducted across 14 practices in London and shaped the delivery and implementation for Wave two of the study. Unfortunately, data from Wave one was not included in the feasibility report. The second wave included six practices, three practices recruited patients opportunistically and three practices recruited patients via hypertension disease

registers. In total, 526 participants were recruited and 449 were screened using the GPPAQ; 14% were active, 13%, moderately active, 24%, moderately inactive, and 50%, inactive. From the initial screening, 83% (n = 367) were interested in attending LGM; 315 patients were involved in the BI, implying a loss of 14% of those initially screened and interested in the LGM intervention; 301 participants were reported to be ready for change and 74% were classified as being low risk, 24%, medium risk, and 1%, high risk. After the BI, 296 patients were signposted to local physical activities; 117 chose to use local authority services, 88 chose to perform self-directed outdoor PA, 42 selected pedometer schemes, 27 participants attended private fitness clubs, 18 chose sports and dance clubs, and 4 participants were signposted to AOR. A total of 101 participants were involved in follow-up consultations at 15 weeks, on average, after screening. The time taken by health professionals for patient screening ranged from 1 minute 30 seconds to 19 minutes and from 3 to 21 minutes for delivery of the BI (Bull *et al.,* 2008) although some screening time may have included the BI.

The main conclusions from the feasibility study were that training regarding the promotion of PA helped health professionals raise awareness and emphasise on the importance of PA. However, inconsistencies were reported regarding the competence of MI used within the feasibility study, so future trials exploring practitioner MI training and competence are recommended (Bull & Milton, 2011). MI techniques were viewed as beneficial for behaviour change although no quantitative evidence supported this. It was a "liked process" by both patient and health professional, rolling with resistance, where the patients decide when they are ready for change and the health professionals support and guide the patients on their journey (Miller & Rollnick, 2002). General outcome benefits

reported from the feasibility study included weight loss, improved breathing, reduced blood pressure and improved mental health/wellbeing (Bull *et al.,* 2008). However, the anecdotal statements are unsupported as this study was designed to assess the feasibility of a scheme to provide a complete care pathway inclusive of costs, rather than its effectiveness of PA behaviour outcomes. Therefore, Bull *et al.* (2008) recommended that LGM should be evaluated thoroughly to better understand its effectiveness in increasing PA after completion of interventions, three and six months later to evaluate the long-term effect of PA behaviour change; to the researchers best knowledge, this aspect has not been studied to date. Additionally, Dugdill *et al.* (2005), drawing on the findings of their review of PARS, also recommend that PA interventions should be psychologically based and involve MI.

5.2 MI and Behaviour Change

MI was the communication style for the BI of the LGM pilot study described above (Bull & Milton, 2010). MI is "A collaborative, person-centered form of guiding to elicit and strengthen motivation for change" (Miller & Rollnick, 2009, p.137), assuming that an individual is ambivalent about change. The communication style emerged from clinical practice involving alcohol addictions (Miller, 1983) rather than from a theoretical framework (Michie & Johnston, 2012). When the causal effect was published, interest in the effect of MI extended to cessation of maladaptive behaviour (i.e. alcoholism, smoking, drug abuse) and promotion of adaptive health behaviour change (i.e. medication use, PA, fruit & vegetable intake; Miller & Rose, 2009). A key concept of the MI communication style is to do no harm to the patient during a consultation by avoiding resistance (Rollnick *et al.,* 2005).

MI has foundations in the Rogerian theory (Rogers, 1951), i.e. to embrace genuine respect of others and compassion with a position of being client-centred. The spirit of MI is collaborative, supporting autonomy, and evocative: Collaborative in being alongside the client; supporting autonomy as promoted in SDT (Deci & Ryan, 1985) to support clients in making the right choices for themselves; and evocative in eliciting the choice from the client and maintaining the expert patient position. The guiding principles of MI are expressed using the acronym RULE: **R**esist the righting reflex, **U**nderstand your clients motivation, **L**isten to your client, and **E**mpower your client (Rollnick *et al.,* 2008). Core communication skills include open-ended questions, well-timed affirmations, frequent and skilful reflective listening statements, and using summaries to communicate understanding – the acronym for these skills is OARS. These communication skills are used to explore and resolve ambivalence about behaviour change and strengthen change talk.

Several tools and strategies can be used in an MI session (i.e. setting a scene, agreeing on agenda, discussing a typical day, importance and confidence rulers, looking back and looking forward, exploring options, agreeing on goals and setting a plan; Rosengren, 2009). An analogy of an MI experience is that it should feel more like a dance than a wrestle (Scales *et al.,* 2003). Eliciting client commitment is thought to be an important factor in behaviour change, and fluctuations are likely throughout an MI session (Amrhein *et al.,* 2003). Therefore, the practitioner is encouraged to remain flexible when using tools and maintaining the integral spirit of MI (Antiss, 2009).

Positive findings have been reported when using MI for problems such as alcoholism (Miller *et al.,* 1993), diabetes (West *et al,* 2007; VanWormer & Boucher, 2011), fruit and vegetable intake (Resnicow *et al.,* 2002), treatment engagement (Carroll *et al.,*

2006), mental health interventions (Humphress *et al.,* 2002; Westra & Phoenix, 2003; Westra & Dozios, 2006; Arkowitz *et al.,* 2008), and PA (Scales, 1998, Elley *et al.,* 2003; Michie *et al.,* 2009). However, when exploring the literature on the effectiveness of MI for PA behaviour change, the research findings are equivocal (Rubak *et al.,* 2005). More than 200 clinical MI trials have been published and meta-analyses have also been conducted (Dunn *et al.,* 2001b; Burke *et al.,* 2003; Hettema *et al.,* 2005; Rubak *et al.,* 2005). MI intervention studies, although expensive, have not shown significant PA behaviour change in the long term (Harland *et al.,* 1999). Additionally, in well-controlled multi-site trials, MI has been found to be effective in some research studies and not in others in different research locations (Winhusen *et al.,* 2008). These results are potentially due to challenges when comparing different study methods and MI proficiency. Advice giving (non MI) is thought to be ineffective in changing PA behaviours (Hillsdon *et al.,* 2002), whereas the Cardiovascular Health Initiative and Lifestyle Education (CHILE) study findings indicate that MI enhances adherence to PA. The results showed an increase in brisk walking from 3.5 to 7.5 hours in the study group as compared to the control group after a 12-week intervention (Scales, 1998). Further, adapted MI, sometimes referred to as MI Enhancement (Burke *et al.,* 2003), has also been found to produce positive outcomes for PA behaviour change (Scales, 1998; Hardcastle *et al.,* 2008). MI has been reported to be effective with a proposed upper limit of two to three hours of MI tolerance (Miller & Rollnick, 2009); Rubak *et al.* (2005) stated MI for 15 minutes is sufficient for supporting a lifestyle behaviour change.

The experience of MI interventions has been considered an improved experience for both the patient and health professional (Scales & Miller, 2003), enabling a greater sense of satisfaction which allows the patients to evolve at a pace that is right for

them. Hence, success can be seen in supporting behaviour change to readiness as well as in achieving the end goal (i.e. increase in PA; Britt *et al.,* 2004).

According to Anstiss (2009), MI may provide a front-line approach to effectively support health behaviour changes, with the intention of focusing on building the patients self-efficacy and supporting behaviour change through patient-centred care. However, Knight *et al.* (2006) strongly criticised the MI research conducted to date in physical healthcare settings. Eight studies published from 1996 to 2008 were used in their systematic review. Lack of details on the training processes and use of non-validated questionnaires were amongst their major concerns. Additionally, in other studies, the use of non-adherent MI methodology was reported, for example providing a pedometer (Bennett *et al.,* 2007), without considering participant autonomy.

As part of the LGM care pathway, a supporting booklet was produced for the participants and BI teams to use as a guide during the MI session (DH, 2009b), to cover for methodological details which can be missing from published studies (Stewart *et al.,* 2001; Elley *et al.,* 2003). Breckon *et al.* (2008) acknowledged that one of the key challenges in adopting MI interventions is the treatment reliability of the intervention involving MI training, processes during the intervention, and competence of the MI sessions (Bellg *et al*., 2004). A review of 72 studies found the average time for delivering MI was 2.24 hours over 2 sessions with 9.92 hours of training (Hettema *et al.,* 2005). With regard to PA BI, Hillsdon (2002) provided 30 minutes of BI time, while the Welsh exercise referral scheme provided 12 to 60 minutes of consultation time, with an average of 35 minutes (Murphy *et al.,* 2010). This is in contrast to the suggested MI BI of five minutes recommended in the LGM care pathway (Bull & Milton, 2011). Conducting appropriate training is thought to be

a key component to maintaining the integrity of MI principles and for gaining substantial evidence for comparative analysis of health behaviour change. Emmons & Rollnick (2001) suggest that as MI is shared across health settings, the adaptations should be monitored to prevent confusion.

Moreover, owing to the growing popularity MI globally to support behaviour change, a clear understanding of what MI is and what it is not is necessary to protect the quality of MI research because of the potential risk of re-invention of MI (Miller & Rollnick, 2009). According to Abraham and Michie (2008), the diversity of behaviour change techniques used in brief interventions is thought to hinder progress in understanding what helps someone change their behaviour, as study findings are often difficult to compare when methods are not clearly outlined and MI competence varies among studies. Given that the MI communication style requires both technical skill and a relational spirit (Miller *et al.,* 2008), MI training is critical and yet poses a challenge to the reliability if MI (Emmons & Rollnick, 2001; Burke *et al.,* 2003; Breckon *et al.,* 2008).

Studies conducted by Bill Miller, the creator of MI, at his clinic have shown a greater effect size (0.51) than studies conducted elsewhere (0.21), highlighting the importance of training, supervision, and integrity checks (Burke *et al.,* 2003) as well as of the competence assessment of MI using validated tools such as the Motivational Interviewing Treatment Integrity (MITI; Madson & Campbell, 2006). Madson *et al.* (2009) consider the established MI training community to be encouraging and the eight stages of learning MI a to be logical framework to develop MI competence. The eight steps to learning MI skill are openness to collaborate with clients own expertise; proficiency in client-centred counselling

including accurate empathy; recognition of change talk, ambivalence, and resistance; eliciting and strengthening change talk; rolling with resistance; negotiating change plans and integrating MI with other therapy models (Miller & Moyers, 2006); enabling engagement in the behaviour change process and focus; and evoking change talk and planning. The baseline skill set required for MI training is not that of a psychologist or counsellor although this was thought to be of value for church-based interventions (Resnicow *et al.,* 2002). However, in Rubak *et al.'s* (2005) review, the education level of the MI practitioner was not related to the outcome effect of MI intervention. Miller *et al.* (2004) reported that workshop training (e.g. for advice giving) was more effective in developing MI competence and reducing MI non-adherence, with the practitioner-induced behaviour change being maintained over four months when follow-up support was provided. This indicates the MI professionals experience competence slippage (relapse) in their behaviour change too. To minimise this potential slip, the LGM pilot study which included two days of MI training (Bull *et al.,* 2008), with additional supervision and assessment after intervention, was considered important for the development of MI competence (Bull *et al.,* 2010; Hettema *et al.,* 2005).

Individuals referred to PARS for mental disorders have showed low adherence to the PA intervention (Crone *et al*., 2008). Indeed, although the positive relationship between PA and mental health has been reported (Lord and Green, 1995; Mental Health Foundation, 2005; Netz *et al.,* 2005; Saxena. *et al.,* 2005; Anderson & Shivakumar, 2013), the types of exercise or referral process to help reduce symptoms of depression is unknown (Mead *et* al., 2009). The PARS need to be flexible to accommodate the fluctuations experienced because of individuals mental health conditions (Grant, 2000), thereby warranting an individual approach and

tailoring of the PA intervention to meet the needs of the individual referred. MI (used as part of the LGM PA intervention) aims to provide an autonomy-supporting environment which acknowledges ambivalence about change, which could otherwise be misunderstood as resistance or non-adherence (Engle & Arkowitz, 2006). A depressed patient may discontinue a referred programme because of a misunderstanding (Garcia & Weisz, 2002) and not being aware that PA is a preferred treatment for their mental disorders (McCarthy *et al*., 2005). Since the first publication of MI (Miller, 1983), the application of MI has extended to include treatment of psychological problems including depression (Arkowitz *et al*., 2008), with one large-scale trial on MI for mental disorders (Murphy *et al*., 2010). No effect on PA levels was reported for patients referred for mental disorders, and the competence of the MI delivered during the intervention was thought to be a limitation of the study (Murphy *et* al., 2010), probably because the environment did not support autonomy.

The current research (Study 4) is the first known research conducted on LGM in Northamptonshire that aims to report the adherence to LGM and PA behaviour change of participants referred for depression, whilst critically assessing the competence of the MI delivered during the PA intervention. The LGM Pilot in Northamptonshire was commissioned, without a budget, by Public Health commissioners. The Commissioners specified that depressed patients were to be recruited for the study (as detailed in Section 1.8) owing to concern regarding the potential health burden of poor mental health (NICE, 2010; McCrone *et al.,* 2008). Hence, depressed patients were to be supported to increase their PA to enhance their mental health. PA behaviour change was measured in this study using the IPAQ (Section 4.2), as the GPPAQ screening tool previously recommended for LGM

does not yield accurate results for PA behaviour change (Chapter 4).

5.3 Aim and Objectives

5.3.1 Aim.

The aim of this study was to measure adherence and PA and depression levels during the first LGM PARS in Northamptonshire from January 2011 to September 2011. Adherence to the intervention, PA and depression levels at 3 and 6 months, and MI competency were measured.

A secondary aim was to compare the adherence of the AOR/LGM participants at six months.

5.3.2 Objectives.

- Assess adherence to LGM
- Compare PA levels using IPAQ at induction and three and six months
- Compare PHQ-9 depression scores at induction and three and six months
- Monitor the reliability of MI during the intervention using MITI and CARE measures
- Compare adherence to AOR and LGM at three months

5.3.3 Hypotheses and Research Questions.

The null hypotheses of this study were:

H^o1: There will be no significant difference in PA levels (MET minutes/week) for LGM participants over 0, 3, and 6 months.

H^o2: There will be no significant difference in PHQ-9 (depression) scores for LGM participants over 0, 3, and 6 months.

H^o3: There will be no significant correlation between PA levels (MET minutes/week) and PHQ-9 (depression) scores at 3 and 6 months for the LGM participants

Two additional research questions were proposed:

1. What is the percentage difference in attendance for LGM and AOR sample (Study 1)?
2. What is the MI competence during the intervention? (To address the concerns regarding the reliability of MI interventions; Breckon *et al.*, 2008).

5.4 Methodology

5.4.1 Participants.

Forty patients were recruited by health professionals from a health centre in Northamptonshire: some were opportunistically recruited because of a history of depression and inactivity, while others used leaflets placed at the reception for self-reference. Depressed patients were invited to increase their PA levels as a treatment for their depression, in addition to other medical care provided by the health professional. The referred patients were screened by a health professional via

GPPAQ (Physical Activity Policy Health Improvement Directorate, 2009) to measure their PA levels; in addition, the participants were screened for depression using the validated Patient Health Questionnaire (PHQ-9; Kroenke *et al.,* 2001), a tool that is considered reliable, valid, and practical for assessing the depression level of patients in a clinical setting and as a "research tool" (Kroenke *et al*., 2001, p.606). The PHQ-9 comprises nine questions with four options of severity for each response as seen in Appendix E.1. The final PHQ-9 score is the summation of all responses and the tool has been shown to detect depression outcome changes over time (Lowe *et al.,* 2004.) If the participant was inactive, moderately inactive, or moderately active with a PHQ-9 score above one and assessed as being stable, the patient was scheduled for an appointment with a trained MI intervention team. The MI session involved a 30–60-minute discussion with the participants at the health centre, including time to complete research questionnaires.

5.4.2 Measures.

A questionnaire was designed (Appendix E.1) taking into consideration the hypotheses and research questions (Section 5.3.3), and selected outcome data from the questionnaire have been used for this thesis. Data were selected after revising the hypothesis for this thesis. PA levels were measured using IPAQ (Appendix B.4) as used for the AOR Study reported in Chapter 2. Depression was measured using PHQ-9 (Kroenke *et al.,* 2001), the validated tool used at the health practice where the patients were recruited as described above. MI reliability measures included the MITI (Appendix E.2) to code a sample of MI audios and the CARE measure (Mercer *et al.,* 2004), used to measure the patient experience of the MI session.

5.4.3 Data collection.

Participants were provided with information sheets prior to the MI session and were given an opportunity to ask questions at the start of the meeting. With signed consent, the session was audio recorded and the questionnaire was completed at induction and three and six months. All non-attendee LGM participants were sent the follow-up questionnaire via the post. Although intention to treat could have been used, for missing data it was decided to not include due to inconsistent methods for the intention to treat approach (Alshurafa *et al.,* 2012). Furthermore, not including missing data and considering the data as incomplete is a recognised option in longitudinal studies (Myers, 2000).

5.4.4 MI team.

The LGM intervention team included interested parties as there was no financial budget available for the pilot. The team was brought together by a Public Health Commissioner in Northamptonshire PCT and consisted of a PCT commissioner, researcher, mental health worker, health trainer, sports co-ordinators, and health professionals. In addition, the LGM MI booklet, a catalogue of physical activities collated by Northamptonshire Sport was made available. If a participant chose an activity that was not in the booklet, online resources and local networks were explored for information and additional options for activities were provided.

5.4.4.1 Training.

The MI team was trained in three phases: Phase 1 – 1-day introduction to LGM; Phase 2 – two days of MI training over two weeks with practical experience in

between training where possible; Phase 3 – an individual supervision session using audio recorded MI sessions and two team LGM update training meetings. All training sessions were intended to be conducted in the MI style and were delivered by the researcher and a mental health trainer, both trained in MI. Specifically, the researcher completed six days of training delivered by Motivational Interviewing National Trainers (MINT). Additionally, throughout the training and delivery process, the researcher was subjected to external supervision from an MINT member and external validation checks for MITI coding.

5.4.4.2 MI sessions.

MI sessions were delivered by the trained MI team. Each session lasted up to one hour and was delivered in the health practice. The LGM patient booklet was used as a guide, where appropriate, during the MI sessions. The aims of the one-to-one MI session were to ask open questions to elicit change talk from the participant, reflect on what the individual was saying and develop self-efficacy by providing affirmations, and summarise their intentions. These aims were achieved by exploring ambivalence and asking the participant how important the PA change was to them, exploring benefits of change and by looking forward and back should the change occur. If appropriate, during the conversation, physical activities were explored and the individual was guided to begin participation. Participants' individual experiences with the PA behaviour change, their future intentions, and if required, the revised PA action plan was reviewed.

5.4.4.3 MI reliability.

With permission from the MI team member and the participant, the sessions were audio recorded in order to code MI competence using the MITI coding tool (Moyers *et al.,* 2007). This was done to provide baseline reliability measure (Bellg *et al.,* 2004; Breckon *et al.,* 2008) and to account for drift during the study (Leventhal & Friedman, 2004). A 10% sample of audio sessions (n = 12) was MITI coded internally and 3 sessions were additionally externally coded.

5.4.5 Data analysis.

A power analysis calculation based on a two-tailed α value of 0.5 and an effect size of 0.3 (i.e. medium effect; Cohen, 1988) yielded a recommended sample size of 26 participants with a power of 0.8. To allow for potential drop-out and challenging recruitment (Scott *et al.,* 2011), the first 40 random participants were invited to participate in the research. From the 40 participants recruited, 23 participants attended the 6-month follow-up appointment and 3 participants posted their follow-up questionnaires. Data for all participants were coded and entered into SPSS for statistical analysis. Descriptive statistics were used to assess adherence, IPAQ level, and PHQ-9; IPAQ MET minutes/week values were also calculated (Section 4.5.4.1). PHQ-9 scores were calculated by adding the nine responses to achieve a total score of depression level. The parametric assumptions were explored using SPSS. The data met the initial assumptions and $Z_{skewness}$ and $Z_{kurtosis}$ values were calculated for PHQ-9 and IPAQ data. PHQ-9 data were normally distributed (within +/-1.96) and IPAQ data was not normally distributed (outside +/-1.96); the data lacked equal variance. Thereafter, a repeated-measures K-related samples test was conducted when using IPAQ MET values to test statistical significance. Barring the 4th

parametric assumption, all other parametric assumptions were met for the remaining data. Vincent (2005) states that equal variance can be violated in such circumstances; therefore, PHQ-9 scores were subjected to repeated-measures ANOVA. Correlations between IPAQ and PHQ-9 data at induction and three and six months were calculated using bivariate correlation Spearman's tests because of the presence of assumed non-parametric data for IPAQ (MET) values; α was set using the Bonferroni correction (0.05/3 = α = 0.017) to test for statistical significance.

MITI coding was conducted according to guidelines (Moyers *et al.,* 2007) for 12 MI audio sessions across induction and three and six months. The scores were then collated to report the mean average scores for the MI team. The CARE measure (Mercer *et al.,* 2004) was scored from 1 to 5 for each question response, and totalled and averaged across participants at each stage of data collection.

5.4.6 Comparison of AOR sample and LGM.

A purposeful sample of 40 depressed referrals from AOR (Chapter 2) was used to compare the LGM participants in this study and assess whether the PA intervention including MI had an impact on adherence and PA MET minutes/week at three and six months. Descriptive data were used for the comparison.

5.5 Results

5.5.1 Participants.

In all, 40 participants were recruited and screened to ensure they met the criteria for inclusion. The average age of participants was 47 +/- 18 years (n = 39); 70% were female (n = 28), 30% were male (n = 12), and 85% (n = 34) were White British.

5.5.2 Adherence.

A total of 37 participants (93%) attended the initial brief intervention, 26 (65%) completed the 3-month review, 3 participants returned the 3-month questionnaire by post, 23 (58%) completed the 6-month review, and 3 returned the 6-month questionnaire by post.

5.5.3 IPAQ level.

The mean increase in MET minutes/week values was 2292 MET at induction to 3603 MET at 3 months and 4004 MET at 6 months.

On computing the data from induction to 3 months and induction to 6 months and using descriptive statistics, the mean increase in self-reported PA from induction to 3 months (n = 24) was found to be 1135.92 +/- 3433.28 MET. The mean increase in self-reported PA from induction to 6 months (n = 24) was 1765.90 +/- 4070.90 MET.

Table 5.1

PA levels from induction to three months and from induction to six months

Time Period	N	PA MET min/wk	SD
Induction to 3 months	24	1135.92	3433.28
Induction to 6 months	24	1765.90	4070.90

The actual number of participants that self-reported an increase in PA levels was 15 at 3 months and 16 at 6 months, from a total of 40 participants inducted.

When testing the hypothesis H^o1 (PA behaviour change), 21 participants were included in the K related samples test owing to missing data. There was no statistical significance ($p > 0.05$) between the IPAQ MET values at induction and three and six months; the mean increase of 1000 MET minutes/week is a meaningful increase in PA levels.

5.5.4 PHQ-9 score.

On computing the data from induction to 3 months and induction to 6 months and using descriptive statistics, the mean decrease in PHQ-9 score (n = 29) from induction to 3 months was found to be -2.41 +/- 8.48 and the mean decrease in PHQ-9 score (n = 26) from induction to 6 months, -3.77 +/- 6.17. A meaningful reduction in self-reported depression was observed for most participants in the short term. Of note, one participant's PHQ-9 score increased by 21 points at 3 months.

The data were subjected to repeated-measures ANOVA. Assumptions of normal distribution, homogeneity of variance, and spherecity were met. The results showed that differences between the different times were unlikely to have arisen by sampling error (F = 5.57, DF = 2.00; p = 0.011). Pairwise comparisons were carried out between each of the time periods using the Bonferroni correction (0.05/3 = α = 0.017) to test for statistical significance. Table 5.2 shows the statistical significance between induction and the six-month PHQ-9 data – a statistical significance for reduction in PHQ-9 levels in the long term (p = 0.01).

Table 5.2

Paired Sample *t*-Test PHQ-9 data

Time period (months)	Mean reduction	SD	*t*	DF	*p*
0-3	2.41	8.48	1.53	28	0.14
3-6	1.28	6.31	1.01	24	0.32
0-6	3.77	6.17	3.12	25	0.01

5.5.5 IPAQ MET values and PHQ-9 level correlation.

The Spearman's correlation test was conducted to determine the relationship between physical activity (IPAQ) and depression (PHQ-9) values at induction and

three and six months. There was a significant ($p < 0.05$) moderate correlation ($r_s = 0.4$) between PHQ-9 and IPAQ (MET minutes/week) data at induction only (Table 5.3). At three and six months, the correlation was not statistically significant ($p > 0.05$).

Table 5.3

Spearman's correlation: IPAQ and PHQ-9

		PHQ-9		
IPAQ		Induction	3 Months	6 months
Induction	r_s	.391*		
	P	.024		
	N	33		
3 Months	r_s		-.252	
	P		.224	
	N		25	
6 Months	r_s			-.071
	P			.735
	N			25

* Correlation is significant at the 0.05 level (2-tailed).

5.5.6 MITI coding.

Table 5.4 shows the MITI coding scores. Global rating is a combination of evocation, collaboration, and autonomy. MI adherence is measured by the individual using MI asking permission from the person they are supporting prior to giving them information, by affirming the individuals strengths and values, emphasising their control and generally providing non-judgemental support. The results show that the mean average scores for the MI team were at beginner proficiency for global rating and open questions; the MITI scores show that the average score was below beginner proficiency for reflections, question to reflection ratio, and MI adherence. There were no MITI scores to demonstrate MI was delivered at the level defined by MITI as competent.

Table 5.4

MITI coding scores

	Average	Beginner proficiency	Competency
Global Rating	3.53 +/- 0.88	Average 3.5	4
% Reflections	38% +/- 22.84	40%	50%
% Open Questions	58% +/- 22.88	50%	70%
Reflection to Question ratio	0.77 +/- 0.43	1	2
% MI adherent	63% +/- 27.54	90%	100%

5.5.7 CARE measure.

The mean CARE score at induction (n = 35) was 46.26 +/- 4.57, at 3 months (n = 29), 44.86 +/- 5.73, and at 6 months (n = 26), 47.65 +/- 3.86. This is an average rating of excellence at induction and three and six months.

5.5.8 AOR sample and LGM adherence comparison.

The attendance was lower for AOR than LGM at 3 months; 23% of the AOR participants and 65% of the LGM participants attended the 3-month PARS review.

5.6 Discussion

The five PA care pathway stages were successfully piloted in Northamptonshire, as detailed in the LGM feasibility study (Bull & Milton, 2010), without a budget. From the total referred cohort, only one referral was received outside of the referral criteria for depression levels with a PHQ 9 score of 0 and GPPAQ screening was effective in that no "active" GPPAQ PA level referrals were received. This was a positive reflection of the screening process compared to the initial feasibility study by Bull *et al.* (2008), whereby 39 screened patients from the total 526 participants were not eligible to continue with the care pathway. In the current study, this was achieved by emphasising on the criteria for referral during training and follow-up meetings with the health professionals. Participant mean age was similar to that reported in other studies on PARS (Pavey *et al.,* 2011) and more females were recruited than males, as reported in the LGM feasibility trial (Bull & Milton, 2010).

The attendance rate of 93% (Section 5.5.2) of the total number of referred patients at the MI session in this study was 6% higher than the attendance rate in the

feasibility study (Bull & Milton, 2010) and attendance at the follow-up review was 65% for this study compared to 28% reported in the LGM trial (Bull & Milton, 2010), probably because of the difference in sample size, i.e. 367 for the LGM feasibility study trial and 40 for this study, implying a potentially personal approach involving a small number of participants. Another critical difference may have been the variation in the time spent with each participant which was notably higher for the Northamptonshire pilot study: 3–21-minute-long intervention during the feasibility study versus 30-minute-long intervention for this study, implying that the more the time spent using the MI communication style (Rollnick *et al.,* 2008), the higher the participant engagement. However, there are practical and financial implications of spending increased amounts of time for delivering MI within primary care. Previous studies have recommended further research into more intensely resourced interventions that can produce PA behaviour change (Harland *et al.,* 1999; Elley *et al.,* 2003; Michie *et al.,* 2009) in a cost-effective manner (NICE 2006c). LGM guidelines suggest a modest five-minute-long BI (Bull & Milton, 2011), whereas BIs have been reported to elicit behaviour change after 15 minutes of MI (Rubak *et al.,* 2005), and in 30 to 35 minutes in the case of PA (Hillsdon *et al.,* 2002; Murphy *et al.,* 2010). In the current study, at least 30 minutes were allocated for the LGM intervention. Practically, the additional time required for MI may present challenges to health professionals across different settings (i.e. emergency room, general practice, in-patient setting, and specific behaviour change counselling sessions; Emmons & Rollnick, 2001), as does the time required to train and continually develop MI competence (Miller & Moyers, 2006). Hence, research is required to highlight the key ingredients to enable the MI to be delivered efficiently.

5.6.1 PA behaviour change.

Sustained behaviour change was observed at 6 months (Section 5.5.3); 38% of the participants at 3 months and 40% participants at 6 months self-reported a PA level increase. However, the standard deviation of 3433.28 MET minutes/week at 3 months and of 4070.90 MET minutes/week at 6 months (Table 5.1) indicates that not all participants showed increased PA levels, probably because of days of illness, pregnancy, and/or lack of comprehension of the PA measure. This study demonstrates that LGM is feasible with respect to an increase in PA on a local level even with no budget allocated. However, the results of PA behaviour change are not statistically significant and hence the H^o1 is accepted. Moreover, the non-generalisable PA level increases were deemed meaningful by the researcher (1000 MET minutes/week; Section 5.5.3) and Public Health Commissioners would be keen to hear about an intervention that increased PA levels (energy expenditure) beyond the CMO recommendations (DH, 2011).

5.6.2 Depression levels.

Furthermore, PA-related outcomes (Teixeira *et al.,* 2012) for depression scores decreased in three and six months for some participants (Section 5.5.4). The reduction in PHQ-9 scores in this study refutes the claim made by Crone *et al.* (2008) that PARS are not suited to mental health patients. The PHQ-9 levels from induction to six months were statistically significant ($p < 0.017$), so H^o2 is rejected for depression levels over 6 months (Table 5.2). Nevertheless, at three months, the PHQ-9 scores did increase for some participants, suggesting mental health worsens before it gets better, probably because of ambivalence towards changing behaviour

and/or sacrifices being made during the behaviour change process.

H^o3 is accepted; there was no significant correlation at 3 and 6 months between depression level and PA level, and owing to the experimental study design, a causal relationship cannot be claimed; increases in PA may/may not have influenced the individuals' mental health. Other lifestyle factors, e.g. relationships, social environment, work, finances, may have also had an impact on mental health but were not measured during this study. Additionally, the medical care prescribed to the depressed patients may have resulted in the change in reported depressive symptoms. In other words, the enhanced engagement levels of this study may have increased the patients' willingness to improve their mental health as reported by Burns and Nolen-Hoeksma (1991). The supportive style of MI aims to roll with resistance and resolve ambivalence rather than using a directive communication style (Miller *et al.,* 1993; Patterson & Chamberlain, 1994) and this may have been a contributing factor to the levels of adherence during the intervention and at the three- and six-month follow-up. Moreover, qualitative analysis of participants' lived experience may capture the reasons behind change, shared by the individual experiencing the behaviour change, and reasons for adherence/non-adherence to enable a deeper understanding of the individuals' journey through the ambivalence to increase PA levels and reduce depressive symptoms. The researcher feels this would make a valuable contribution to research in the future.

5.6.3 AOR versus LGM adherence.

The comparison of AOR and LGM adherence data at 3 and 6 months (Section 5.5.8) tentatively supports Hillsdon *et al.* (2002) that collaborative approaches to

behaviour change are more effective than direct advice giving; however, it is not known how much advice giving and/or collaboration was experienced by participants during the AOR PARS in Study 1. Some of the fitness professionals across Northamptonshire may naturally use a MI communication style without training. Tailor-made sessions may increase PA behaviour change (Stewart *et al.,* 2001) and the meaningful PA level increase perceived in this study is encouraging. The MI BI is an opportunity to guide participants with behaviour change as required for their stage of readiness (Britt *et al.,* 2004) and at least encourages adherence to the intervention as seen in the comparative attendance rates at three months in the LGM and AOR sample.

5.6.4 MI and behaviour change.

The results of this study support previous reports of PA behaviour change when using MI (Scales, 1998; Elley *et al.,* 2003; Michie *et al.,* 2009), although the proficiency of MI delivered across these studies has not previously been reported. The transparency of the MI competence is required to ensure intervention validity (Breckon *et al.*, 2008). Training was provided throughout the LGM pilot in this study and continued supervision was offered to all trainers, as recommended by Miller and Moyers (2006). Additionally, in support of the recommendation for treatment reliability (Breckon *et al.,* 2008), MI competence has been reported for this study (Section 5.5.6). In previous studies, when reported, a variation of competence has been observed in the BI team and this may have led to variations in service levels (Murphy *et al.,* 2010), requiring further study (Bull & Milton, 2011). Although the averaged MI competence was below beginner level (Table 5.4), especially in reflective listening and advice giving in this study, participants rated their overall

experience as excellent throughout the six months via the CARE measure (Section 5.5.7). The CARE measure was used so that the individuals inducted into the LGM had their autonomy maintained as a research participant, meaning no harm has been done to the participant during the PA intervention, by rolling with resistance and supporting the individual at their pace for PA behaviour change (Rollnick *et al.,* 2008). Additionally, not all participants self-reported an increase in PA levels and some individuals reported a higher depression score during the six months; however, the collaborative approach of MI may have supported the individuals' readiness to change including periods of relapse, without causing non-adherence, as progression is considered as important as the end goal of PA increase (Britt *et al.,* 2004). The results of MI competence for this study also suggest that something other than MI technical skill may influence adherence during PARS; this has implications for future MI research relating to PARS, as the intention is to increase PA levels for an individual to enhance their health and not to become proficient at MI. This study has shown that without MI reflections, and in settings where advice is given, adherence and PA levels have increased. Nevertheless, a study which is able to report competent proficiency of MI for a PA intervention, such as LGM, is recommended to understand if MI is an effective communication style for PA behaviour change. The averaged global scores (evocation, collaboration, and autonomy) for the team delivering the MI were at beginner's competency. In practical terms this would equate to the MI team member accepting the patient's own reasons for change, the patient's ideas affecting the session and the patient having choice in the outcome of the session. This is in line with the recent SDT review which highlighted the importance of the professional eliciting internal motives with a patient to support sustained behaviour change (Teixeira *et al.,* 2012).

The impact of the LGM pilot in Northamptonshire from January 2011 to September 2011 was that 8 in 21 participants were inducted into LGM, they received a BI in MI and chose their PA, and self-reported PA behaviour change at 6 months. Hence, a time-intensive treatment of LGM with a BI of 30–60 minutes of MI was engaging for referred patients in the short term. However, in practice, a personalised service may be financially challenging to implement owing to the presence of competing priorities within primary care. This study was unable to conduct a cost comparison because LGM was conducted on goodwill, and this is not sustainable. From the LGM feasibility study, the mean cost per patient for delivering the LGM care pathway was estimated to range from £124 to £630, including cost for training and supporting health professionals (Bull *et al.,* 2008), while the estimated costs of a directive exercise referral scheme was £327 for a PA increase (Stevens *et al.,* 1998). AOR in Northamptonshire for 2228 participants cost approximately £95 per participant, assuming the 14 leisure providers' management fee was £4000, induction session cost £15, and an average attendance of 11 sessions at the leisure centre cost £5 each (Northamptonshire PCT, 2008). Hence, the PA intervention of LGM would potentially cost more but adherence may be higher, in which case cost per adhering individual may reduce in comparison to AOR. As reported in Study 1, 105 participants reported PA increase in long term, in which case the cost to increase PA is estimated to be over £2000 per long-term active participant.

5.6.5 Reflection of theoretical context.

The global MI ratings (Table 5.4) suggest that the MI intervention delivered during the LGM pilot provided an autonomy-supporting environment, to varying degrees across the study. MI began via clinical intuition rather than rational-

deductive ways of knowing and there is no well-developed theory to explain its efficacy (Miller & Rollnick, 2012). However, SDT developed a theory through experimentation that has subsequently been empirically tested (Deci & Ryan, 2012). The autonomous tenet of SDT may suggest a natural fit with MI which advocates volition to instigate self-regulation (Miller & Atencio, 2008). In addition, MI provides facilitating factors to enable personality development and self-motivated behaviour change, by providing social environments that support autonomy (Deci & Ryan, 2012). Both MI and SDT share a philosophical position that "Humans have an innate tendency for personal growth toward psychological integration" (Markland *et al.,* 2005, p. 811), and both approaches are based on Rogerian perspectives of unconditional positive regard and patient centeredness (Rogers, 1951).

On the contrary, there are differences in the nature of the top-down SDT and bottom-up MI approaches (Vansteenkiste *et al.,* 2012); importantly, the emphasis to evoke change talk (Miller & Rose, 2009) may undermine support for autonomy. The mediators of SDT alongside the MI techniques are considered "a potent combination that can contribute to the field of health behaviour change" (Patrick & Williams, 2012, p.2). Consequently, MI techniques have informed SDT studies (Fortier *et al.,* 2007; Silva *et al.,* 2008; *Williams et al.,* 2006) and MI interventions have included SDT measures (Resincow *et al.,* 2005; Rubak *et al.,* 2009). The internalisation process enables the behaviour to become more autonomously regulated over time (Deci & Ryan, 2000). In the context of PA change, the more autonomously regulated the individual becomes towards the behaviour, the greater the effort, engagement, persistence, and stability towards the behaviour evidenced by the individual (Ryan & Deci, 2000), meaning the patient-health professional and patient-fitness professional relationships are

indicative of the level of autonomous regulation (Deci & Ryan, 2005) because of the social context and personality of the individual. In terms of an individual feeling competent about a change, an individual may need to be autonomously integrated prior to feeling authentically competent (Ryan *et al.,* 2008) and such relatedness can be created by a non-judgemental relationship in a warm empathetic environment.

MI and TTM (Prochaska & DiClemente, 1984) are also thought to be compatible and complementary (DiClemente & Velasquez, 2002; Velasquez *et al.,* 2001). Miller (1983) stated that through practice, individuals were not always "ready" to change and hence flexibility was required by professionals to use the most appropriate methods according to the patients' readiness for change (McConnaughy *et al.,* 1983). Therefore, MI was developed as a process to work with individuals identified as less ready to change (i.e. precontemplative, contemplative, preparing; Miller & Heather, 1998).

5.6.6 Research limitations and future research.

The study was conducted over 6 months to determine the long-term impact of PA interventions on PA behaviour and could be extended to 12 months, as recommended (NICE, 2006a). It is important to understand the impact of PA interventions in the long term to ensure that the investment in commissioned resources is beneficial. Due to the specified focus of depressed patients enabled the health outcome to be measured. Whereas, LGM could be replicated for other reasons of referral (i.e. obesity, mobility, neurological) with appropriate health outcome measures for a broader impact. The impact of the PA level increase on health outcomes could be investigated to enable understanding of the impact of

PARS on an individual's wellbeing (WHO, 1946). In the case of a study involving patients referred for their mental health, the study design could incorporate testing PA as a covariate to reduce the symptoms of depression, involving a qualitative approach to understand reasons behind non-adherence of depressed patients and adhering participants' lived experience of the LGM PARS, thus increasing the knowledge base for developing an understanding of the effect of PA interventions on an individual's health rather than only measuring the increase of PA.

In Study 4 in this chapter, three participants returned the postal questionnaire, although some details were missing from the questionnaires and hence the number of participants that attended their six-month follow-up (i.e. Table 5.1) was below the desired power for sample size calculation. Therefore, the sample size may not allow for generalisation of the findings to a wider population and the results should be used with caution when planning future PA interventions within primary care. Consequently, future studies are recommended to develop engagement with research participants by outlining the duration of the study and to involve a large number of participants, allowing for non-adherence whilst still retaining sufficient numbers to meet the required sample size appropriate for statistical analysis.

Chapter 6 – Conclusion

This chapter begins with a summary of the current knowledge on PARS regarding adherence and PA behaviour change. The main findings from Studies 1, 2, 3, and 4 are then detailed and discussed in terms of the theoretical, methodological, and practical contributions of this research. The chapter concludes with research limitations and recommendations for future research.

6.1 Current Knowledge

Physical inactivity is one of the key risk factors responsible for the growing epidemic of NCDs (WHO, 2011) and is linked to mental health illness (Mental Health Foundation, 2005). In 2008, only 29% of the females and 39% of the males in the UK met the recommended PA level, which was 30 minutes of moderate-intensity PA, 5 times per week for adults aged 18 to 64 years to experience health benefits (DH, 2004). Primary care is considered to provide the opportunity to promote PA and interventions may be appropriate for one in nine consultations (NICE, 2006a). Nevertheless, the positive relationship between PA and health is considered to require effective communication between health professionals and patients (Roberts & Barnard, 2005). Hence, the UK government commissioned various PA interventions (DH, 2004), including PARS (NICE, 2006a). Consequently, the number of PARS across the UK have increased, but the long-term effectiveness of the interventions on PA behaviour change is unknown (Fox *et al.,* 1997). PA levels increase, at least in the short term for some individuals that attend PARS (Williams *et al.,* 2007) although the level of adherence to PARS is concerning (Gidlow *et al.,* 2005). The quantitative

outcome measures of PA levels are reported (Pavey *et al.,* 2011) more often than patient experience to understand non adherence (Hardcastle & Taylor, 2001). Additionally, some PA intervention studies tend to lack methodological detail (Breckon *et al.,* 2008). The primary outcome measure for PARS effectiveness is the PA level (NICE, 2006a); however, a variety of PA measuring methods have been used in different studies (Laporte *et al.,* 1985), making it difficult to compare results across studies (Dishman, 1994), consequently limiting the collation of effectiveness owing to heterogeneity (Pavey *et al.,* 2011). The latest PA governmental guidance (DH, 2011) recommends the LGM PARS (Bull & Milton, 2011). The PA screening tool for LGM is the GPPAQ (Physical Activity Policy Health Improvement Directorate, 2009) which is a quick, simple self-reporting PA screening questionnaire. On the other hand, valid and reliable PA self-reporting questionnaires such as the IPAQ (Craig *et al.,* 2003) have been used to measure PA levels internationally (Bauman *et al.,* 2009). In terms of supporting an individual to increase the PA level, problem solving with patients is considered more effective than direct advice giving (Hillsdon *et al.,* 2002) and autonomous tasks are thought to promote positive self talk (Oliver *et al.,* 2008). The systematic LGM care pathway which incorporates MI (Miller & Rollnick, 2002), a communication style to elicit change talk, is considered a feasible intervention (Bull *et al.,* 2008) although it is unknown whether LGM is effective in increasing PA levels in order to improve health (Bull & Milton, 2011).

6.2 Summary of Main Findings

The results of the AOR study (Chapter 2; Study 1) show that the self-reported PA levels increased in the long term among those who attended AOR. The mean increase in the long term was above 1000 MET minutes per week which is equal to an increase of 250 minutes of moderate-intensity activity per week. This exceeds the current PA recommended levels for benefit to health (DH, 2011). The behaviour change was maintained in the long term over 12 months. However, this was for only 105 participants from a total sample of 2228, so the impact at the population level is low, as previously reported (Fox *et al.,* 1997). In addition, the proportion of individuals who gained accurate knowledge of the PA guidelines increased from induction to exit of the scheme (Section 2.7.7.1). Because of the introduction of new guidelines, AOR participants would need to update their existing knowledge (DH, 2011). In this study, the statistically significant factors for increased PA levels at three months were sex, initial stage of change, and number of sessions attended. Important when considering cost effectiveness of PARS (NICE, 2006c) and aiming to understand for whom the PA interventions are effective in terms of an increase in levels of PA. Although enrolment was higher among females than males in the study sample, akin to the findings of Gidlow *et al.* (2005), the males self-reported a higher increase in PA level. Brug *et al.* (2005) highlighted the importance of understanding for whom the stages of change is appropriate and this study has shown that individuals contemplating change self-report the largest mean difference in PA levels. Moreover, as previously reported, attendance to the PA sessions is a critical factor in behaviour change (Williams *et* al., 2007). The key finding of Study 1 was that just 5% of the participants who were inducted in this study self-reported a significant and meaningful PA level increase in the long term, a

lower proportion than that reported by Williams *et* al. (2007), adding to the concerns of impact of PARS (Pavey *et al.*, 2011).

The interviews of non-adhering AOR participants highlighted the importance of an appropriate medical referral to the PARS, induction experience at the leisure centre, and potential of PARS participants to re-engage in physical activities. The individuals' perspectives of themselves and their relationship with PA were part of their PARS experience alongside the perception of acceptance into the environment during the AOR induction by others, including the fitness professional. Additionally, competing priorities including children and financial investment were barriers to adherence.

A weak correlation ($p < 0.05$) was found between the results of the GPPAQ which takes around 30 seconds and those of the IPAQ which takes at least 2 minutes to complete. This is the first reported study to conduct a comparative analysis of these two self-reporting PA measures. A large sample (n = 2621) completed both the GPPAQ and IPAQ at induction, 3, 6, and/or 12 months.

The LGM intervention evaluated in this study was the first LGM PARS within the East Midlands; at 6 months, 16 out of 40 of the LGM participants self-reported a positive PA change, with a mean increase of over 1000 MET minutes/week, and a significant ($p < 0.01$) reduction in self-reported depression levels of (-3.77 +/- 6.17). A positive outcome was noted when considering the reported difference between mental and physical adherence rates in previous studies (Crone *et al.,* 2008; Murphy *et al.,* 2010), suggesting that PARS, such as LGM, may support mental wellness; however, a causal relationship was not reported owing to the study design. The meaningful decrease noted in PHQ-9 scores refutes the negative claims of Lawlor and Hopker (2001) and supports the positive

relationship reported for PA and reduction in depression by Mead *et al.* (2009); furthermore, an increase in PA levels was reported in the long term for 1 in 21 AOR participants and 8 in 21 LGM participants over 6 months. The adherence at 3 months was 65% for LGM compared with 23% of the comparative AOR sample. Participants that adhered to AOR or LGM showed an average difference in self-reported PA levels at 3 and 6 months above the recommended level of PA for health benefits (DH, 2011). During LGM, MI competence was evident in global scores which included evocation, collaboration, and autonomy as well as open questions, but competence was below beginner level for MI adherence owing to direct information giving and lack of complex reflections. The low MI adherence may have influenced the depth of the intervention in eliciting behaviour change talk which has been shown to support an individual to change. Nevertheless, the participants rated their experience of the intervention as excellent overall, probably because open questions were used in the MI sessions which were rated as “beginner’s competence”, enabling a patient to be autonomous and take charge of his/her behaviour change.

6.3 Contribution

This section will detail the theoretical, methodological, and practical contributions made by the studies included in this thesis.

6.3.1 Theoretical contributions.

Changing sedentary behaviour and adopting PA is a complex process and discussion of the elements observed according to SDT and TTM has been included in Chapters 2, 3, and 5. This section will further discuss SDT and TTM behaviour change theories in the context of enhancing adherence and PA level increase for PARS.

Stages of change (Prochaska *et al.,* 1992) were recorded and evoked during Study 1 and Study 2. In Study 1, individuals were asked to select and discuss a statement that could be related to precontemplation, contemplation, preparation, action, and maintenance, while in Study 2, they were asked to comment on their readiness, if appropriate to their lived experience. Additionally, individuals inducted into AOR (Study 1) and LGM (Study 4) demonstrated non-adherence which could be related to a period of relapse. The low average attendance for 12 sessions, with a third of the possible sessions available, would suggest the majority of participants were not fully engaged in the AOR scheme. Once referred, the subsequent increase in knowledge during a PA intervention may stimulate consciousness awakening and highlight discrepancy in previous/current PA behaviour for individuals, thus providing an external cue to action. However, the processes of change were not measured for this study. The health and fitness professionals' awareness of the individuals' stage of change enabled appropriate support to be provided to individual to

move towards action (Brug *et al*., 2005). The seven individuals interviewed for Study 2 shared episodes of fluctuation according to life events, whereby the pros and cons of the PA change were being assessed during the unique individual journey of lived experience. For example, Heidi articulated her concerns about the uncertainty of day-to-day life and was non-committal owing to past experiences. The disengaged participants (Max and Dav) were resistant to the change and hence remained pre-contemplative, whilst Linda G stated she had re-engaged in the scheme because of the persistence of the fitness professionals (Murphy *et al.,* 2010). However, for Dav, the contact with the leisure centre was experienced as a hassle and may have created resistance (Section 3.5.8.2). These fluctuations support the spiral construct of stages of change (Figure 1.3) with opportunities for both relapse and progression to the next stage.

In terms of SDT, the motivational drive (Deci & Ryan, 1985) during the induction of PARS may influence adherence. Non-adhering participants that perceived they were competent to perform PA, such as Mr T and Polly, and spoke about their intrinsic motivation, whereas Dav and Max were not motivated; this shows the difference between engaging in PA via a private leisure centre or AOR provider and not engaging. An individual may require external motivation initially – Max and Heidi are examples of individuals that require additional support to access a difference environment; they had no intention to attend their induction at the leisure centre on referral from the health professional. The autonomous nature of PA choice seemed to be linked to long-term enjoyment and commitment to maintaining PA level for Mr T and for Polly even after relapse due to injury. Linda G became autonomous, but the relatedness of the environment was important for her to engage during the initial stages as she connected to feeling competent once more. Similarly, Tricia was self-motivated, but this was not captured in

quantitative AOR evaluation data; her PA levels did increase because of the awareness of the health benefits of PA, especially for her. She attended an alternative leisure provider to meet her needs and intends to re-engage after treatment even though she does not enjoy the experience. The various reasons for relapse and/or non-adherence include current health condition (Dav, Linda, Max, Heidi, Pol, Tricia), weather (Linda), and cost (Mr T., Heidi). Re-engagement was energised by a different induction experience second time round (for Linda) and this autonomy-supporting experience enabled her to feel competent. Both Tricia and Mr T expressed their internalised motivation to become more physically active; in contrast, not being heard by the health and fitness professionals added to the frustrations Dav was experiencing in his life in general, as he emphasised the precontemplative stage of his PA behaviour change at the point of referral, potentially thwarting Davs' internalisation of PA behaviour change. This point is in line with the findings of the latest SDT and PA review, stating the requirement for autonomous choice and the importance of the relationship with the health professional to encourage individuals to adopt PA (Teixeira *et al*., 2012).

The elements of MI that LGM participants experienced provided an autonomy-supporting communication style. The MI sessions developed participants' engagement prior to focusing on the behaviour change, wherein the individuals chose the PA they wanted to engage in, supporting the claim made by Morton *et al.* (2008) that the enjoyment through self-selection of activity may in itself increase adherence. MI may be the communication style that can be used to help people resolve ambivalence about change by evoking intrinsic motivation that is inherent (Rogers, 1951) and developing commitment for change at the pace of the patient expert, meaning in addition to the PA behaviour change of

the patients, the health and fitness professional need to change patients' behaviour by allowing autonomy rather than fixing a schedule and by directing patients to PARS. Thus, particularly BPNT and OIT was evident during this research. Hence, it is not the type of theory applied but the way it is applied that is important, supporting the concept that practical application of theoretical constructs remains imperative (Dishman *et al.,* 1985).

6.3.2 Practical contributions.

This section outlines the practical contributions collated using the researchers' notes and observations throughout the studies. As stated in Chapter 1, the research conducted was part of a project commissioned by Public Health, Northamptonshire. Therefore, initially, collaboration and relationship building was required to carry out the study whilst meeting academic needs. Hence, the study design focused on providing outcomes that could be used to commission future PA interventions, whilst behavioural theory was used to compliment the outcomes and findings of other related studies.

Additionally, the relationship with leisure centres was critical to the data collection across the county for this study. Future PARS studies should be encouraged to build rapport with fitness professionals to encourage their participation in data collection. Additionally, commissioners that aim to provide a service based on equality and inclusion should emphasis on the need for collecting ethnicity data to enable analysis. Missed attendance data of PARS participants may be effectively collected via a swipe card system and the leisure centres are encouraged to share best practice and provide feedback to health professionals so that the PARS process can be further improved. In addition,

contacting non-adhering participants and continuing to engage with health professionals, where appropriate, may minimise inappropriate referrals (i.e. age, induction activity levels, and intention).

Qualitative research can shed light on the patients' experience with the PARS, and this may help local schemes meet the needs of their population. This study has highlighted that AOR could be improved by listening to the patient's readiness to engage, their perception of appropriate PA, and barriers to being active, i.e. physical and mental health concerns. The recommendations can then be practically implemented as part of the quality assurance process.

The GPPAQ may be enhanced as a screening tool by including walking in the category calculation, whilst the IPAQ (short form) could be developed and re-validated into a simpler self-reporting measure which may enhance completion rates for future PA intervention studies and provide MET values (high-level data) for studies measuring PA.

LGM training in primary care, including MI workshops and supervision could provide a systematic care pathway for PA behaviour change, with competent delivery. Additionally, the range of PA opportunities required for PARS with options of PA would require local communities to be interlinked.

6.3.3 Methodological contributions.

This section highlights the methodological contributions of the inductive mixed-method studies designed to explore the adherence and PA levels during PARS.

Thank you letters were sent to AOR participants at 6 months to encourage participation in the 12-month follow-up questionnaires. Only a 3% loss was

noted in follow-up responses at 12 months for the AOR study (Chapter 1). The thank you letters may have enhanced the quantity of long-term effectiveness data collected.

Qualitative data collection is considered valuable in the progression of PARS (DH, 2001) and although not producing generalised outcomes, it may be a more efficient way of using the patient as the expert to increase adherence to PA interventions such as AOR, adding depth to meta-analysis which currently have limited qualitative studies for inclusion (Pavey *et al.,* 2011). Acknowledging that RCTs are the gold standard measurements to measure intervention effectiveness, methodological diversity may be more appropriate: "What is important is that we leave behind the killing fields of the paradigm war and enter more humane and kindly territory of combining methods and approaches in order to answer focused questions about how health promotion initiatives can enhance the quality and quantity of people's lives" (Oakley, 2001, p.28).

The GPPAQ is only to be used as a screening tool for PA interventions and is not to replace other alternative self-reporting PA questionnaires (i.e. IPAQ), given the weak association reported for the GPPAQ and IPAQ in Study 3.

The training, delivery, and competence checks outlined in Study 4 provide details for other researchers to adopt when conducting MI PA interventions to enhance the reliability of PA interventions which do not include methodological detail (e.g. Murphy *et* al., 2010), so that knowledge of the impact of MI interventions and the key elements of MI in PA settings can be enhanced.

6.4 Research Limitations

This research is not without limitations. Limitations within each study are discussed within the appropriate chapter; however, the main limitations are re-stated here. Study 1 had high drop-out rates and consequently large volumes of missing data. Therefore, it may not present the complete outcome from AOR, as participants who may have increased or decreased PA levels dropped out, thereby affecting the intervention outcomes in terms of PA behaviour change. The exit data from Study 1 does not account for participants that continued PA via alternative means other than the AOR leisure centre and participants that continued with AOR but did not attended the exit interview and/or chose not to complete the follow-up questionnaires. PA behaviour change may have occurred, as expressed during Study 2, in Mr T and Patsy who joined an alternative leisure facility and in Linda who re-engaged. In addition, owing to the timeframe of this research, LGM data for Study 4 was only collected up to six months after induction; studying the long-term impact of MI would be beneficial when considering investment in commissioned resources. Additionally, because of the drop-out rate and missing details on returned questionnaires, the number of individuals' data included was below that of the power sample size. The small yet appropriate sample of Study 2 yielded trustworthy data, but the overall results are not generalisable and caution should be used when using the results to plan future PA interventions in Primary Care.

6.5 Future Research

The recommendations for future research based on the findings of each empirical study are summarised below in the order in which the studies are presented in this thesis.

Observations noted by the health professional during the referral process of PARS may provide evidence of the interaction at the point of referral and clarify the intention of the participants towards PA behaviour change. In terms of measuring effectiveness of PARS, guidelines regarding the attitudes and skills to be measured to determine the effectiveness of PA interventions could be specified by NICE to support future studies and homogeneity of outcome measures. Additionally, interviews with individuals who self-reported a decrease in their PA levels may help understand the reasons behind this decrease. Further studies may also investigate the impact of the individuals' health on PA levels after PARS using a mixed-methods design to objectively measure health outcomes and understand the implications of the impact on quality of life for the individual experiencing the change. Further studies could also try to gain an understanding of the impact of increasing knowledge of the recommended amount of PA for health benefits.

By continuing to listen to PARS participants using qualitative approaches and methodologies such as IPA, the lived experiences of the PA interventions can be collated and used to design future interventions to increase PA levels among participants.

In order to work with the evidence base on the effectiveness of PARS self-reporting, a gold standard PA measure is required. Qualitative studies collecting user feedback for PA self-reporting questionnaires (i.e. IPAQ & GPPAQ) could

continue to develop a PA questionnaire to meet the needs of patients and health and fitness professionals.

In future study designs, when considering MI interventions, the reliability of the intervention should be considered to ensure robust effectiveness outcomes from PARS. MI interventions that aim to position the participant as the expert could use the CARE measure to understand how the intervention was perceived by the individual and to determine MI competence. Furthermore, the long-term effectiveness of LGM should be investigated using standardised outcomes, so that studies can be compared via meta-analysis. In addition, as MI research continues, the key ingredients should explored to understand which elements of the communication style effectively support PA behaviour change: SDT motivational theory and MI communication style both value an autonomy-supporting environment to enable behaviour change, so relative autonomy index and MITI coding could enhance the understanding of the relation between theory and communication style during a PA intervention. Additionally, a study on the cost effectiveness of LGM and/or AOR would enable commissioners to assess the impact versus investment for patient populations. The investment in PARS could also be compared to NHS' costs of treating preventable NCDs and mental illness currently and in the future should people not engage in PA.

In addition to the suggestions for future studies highlighted above, understanding an individual's motivation to change is also important (Dishman, 1994), considering every human being is an individual entity (Rogers, 1951), so one would question if it is appropriate or even possible to formulate a one-size-fits all process of change, even though there are global benefits of doing this. In Study 2, Linda G commented that, "A key for each individual is to be found to

unlock the potential of behaviour change". The latest Health Survey in England (2012) reported that the legacy of the Olympics has not reflected in increased PA levels in England and hence there is still much to learn about how to support individuals to change sedentary behaviour. Elements of an MI communication style may offer a way to support individuals with their behaviour change, but the necessary elements and their appropriate application to PARS are aspects that need to be studied further.

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Appendices

Appendix A.1 - Research dissemination

Reports

Public Health Commissioners, Northamptonshire

Effectiveness of Activity on Referral: Summary report February 2012

Presentations

19th January 2010/20th April 2010/1st November 2010 - AOR co-ordinator meetings

24th March 2010 Insights from Workplace; University of Northampton

14th June 2010 Effectiveness of PARS; Service User Group Centre Health and Wellbeing Research, Northampton

15th November 2010 Let's Get Moving effectiveness; Northampton

11th April 2012 Effectiveness of PARS; CHWR Research presentation, Northampton

25th April 2012 AOR study feedback meeting; Northamptonshire

Posters

18th May 2011 Physical Activity Schemes: Do they work?; University of Northampton Poster Competition

17th November 2011 Effectiveness of Physical Activity Brief Intervention 9Let's Get Moving) in Northamptonshire; BHFNC Let's Get Moving, Nottingham Conference Centre

Conferences

1st April 2010 Networking conference, Aberyswerth University

23rd June 2011 Effectiveness of PARS, Northamptonshire; Graduate school conference, University of Northampton

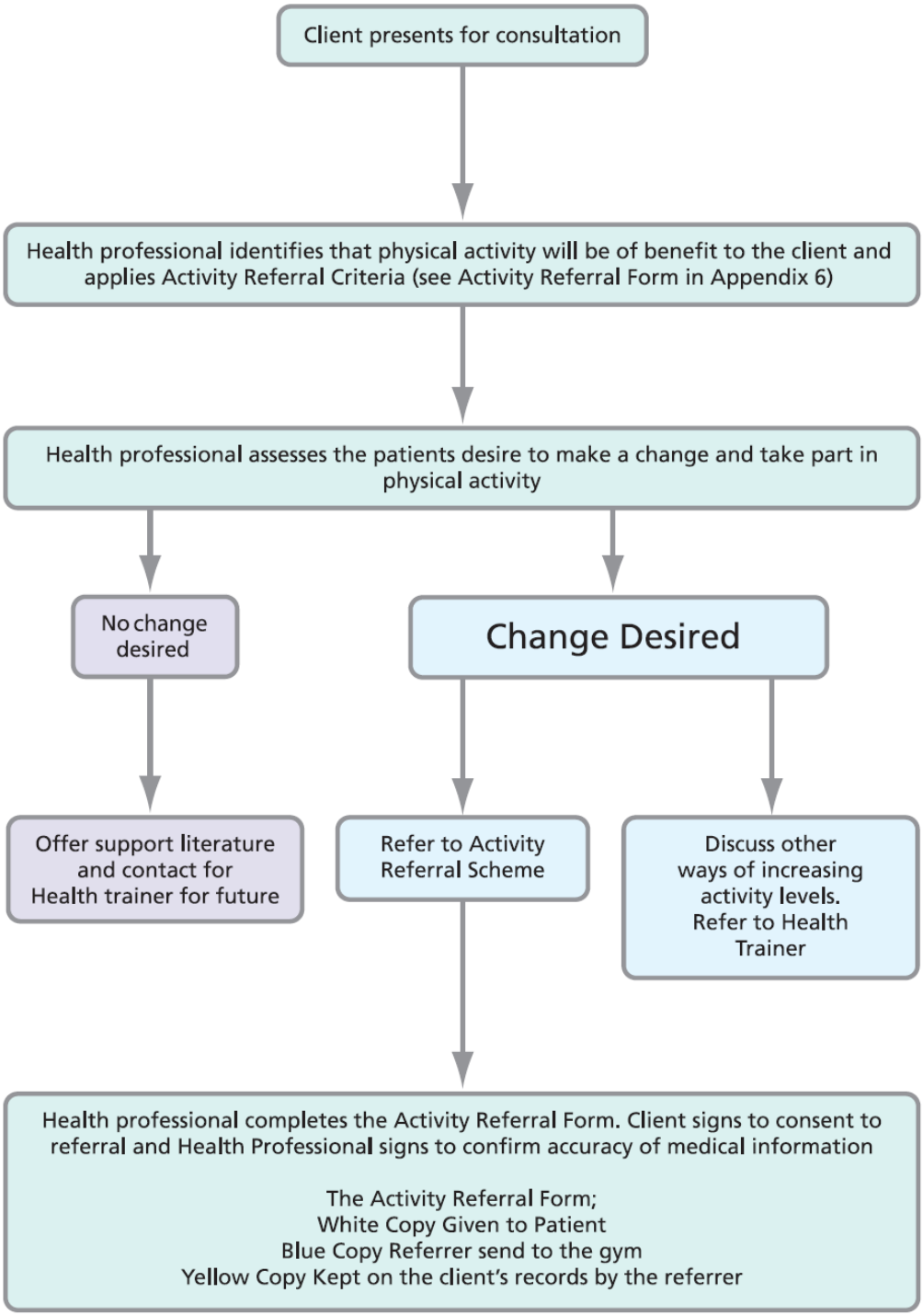
20th April 2011 Effectiveness of Activity on Referral Scheme (AOR), Effectiveness of Let's Get Moving physical activity referral scheme, Workshop: Using motivational interviewing (MI) to support physical activity behaviour change; BPS conference, Grand Connaught Rooms, London

18/19th June 2012 ICMI conference, Lessons from Learning MI workshop and MI and LGM Physical Activity Care Pathway, Venice

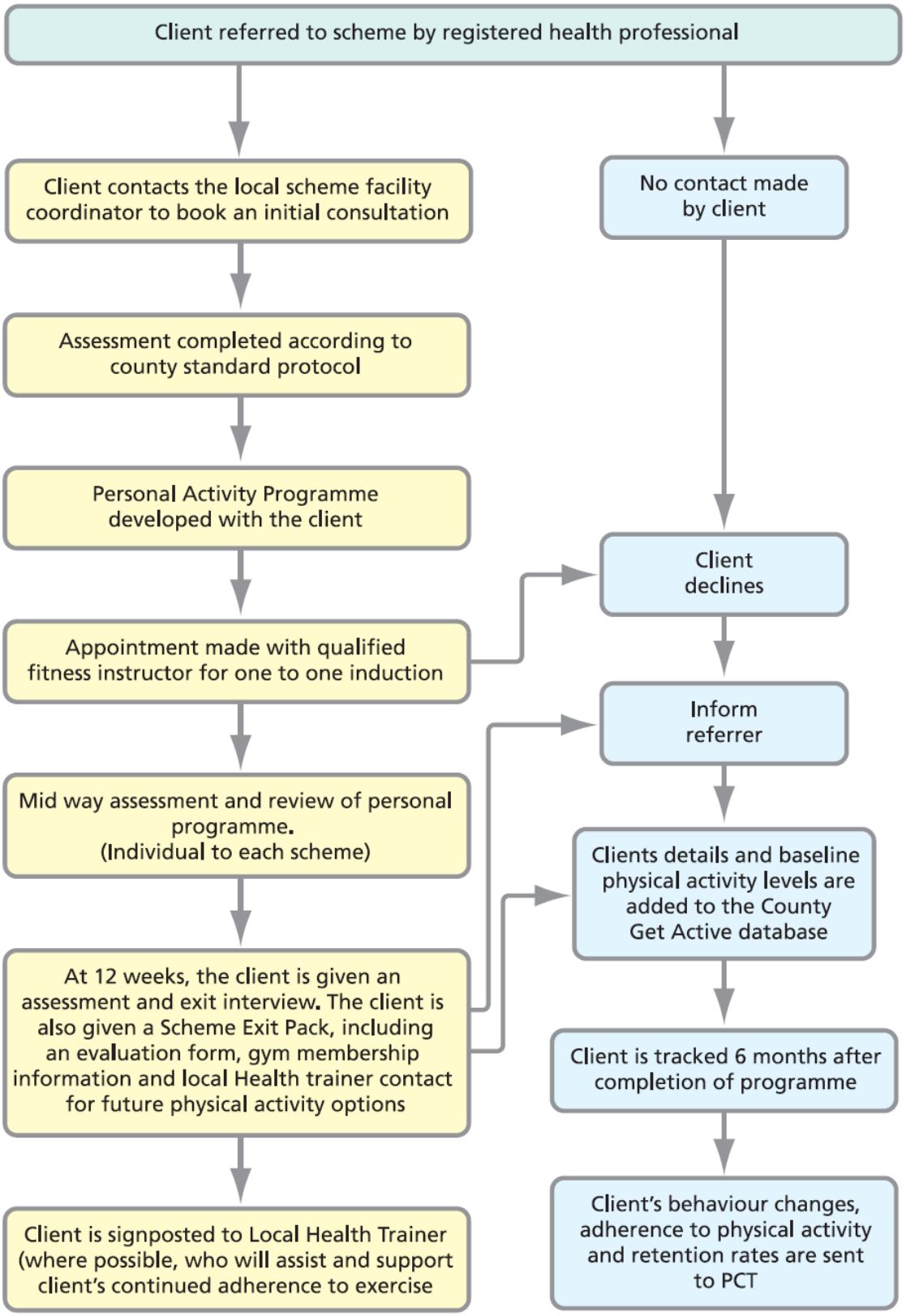
Journal Articles

Clarke, K. & Walker, N. (2013) Getting off the starting blocks: An interpretative phenomenological analysis (IPA) of a physical activity referral scheme (PARS) non-completer. *QMiP Bulletin*. **(15)**, 6-14.

Appendix B.1 - AOR Referral Process



Health professional recruitment and screening (Northamptonshire PCT, 2008).



Induction through to Exit at leisure centre (Northamptonshire PCT, 2008).

Appendix B.2 - AOR 6 and 12-Month Follow-up Questionnaires

PHYSICAL ACTIVITY REFERRAL QUESTIONNAIRE – Six months after exit.

Name:

Address:

Postcode:

Contact telephone No:

Email:

Please circle the appropriate answer.

1. What is the level of moderate physical activity per week recommended by the Chief Medical Officer? (Moderate physical effort so that you breathe somewhat harder than normal)

5 × 30 min

5 × 60 min

3 × 30 min

7 × 120 min

Don't know

2. I can manage my time to be able to do physical activity

Strongly disagree Strongly agree

0 1 2 3 4

3. Physical activity makes me feel good

Strongly disagree				Strongly agree
0	1	2	3	4

4. Physical activity is...

Bad for me				Good for me
0	1	2	3	4

5. When my life is busy, I am confident in my own ability to exercise

Strongly disagree				Strongly agree
0	1	2	3	4

6. Physical activity includes activities such as brisk walking, jogging, cycling, swimming, or any other activity such as gardening, in which the exertion makes you feel warmer or slightly out of breath. Which statement best describes you?

I am not physically active and do not intend to do physical activity in the next six months

I am not currently physically active but intend to become more physically active in the next six months

I am currently physically active but not regularly

I have been engaging in regular physical activity for less than six months

I have been regularly physically active for the last six months

Appendix B.3 – AOR Study 6 Month

Thank You Letter

CENTRE FOR HEALTH & WELLBEING RESEARCH

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"Thank you" for your reply to Activity on Referral Questionnaire

This is correspondence to thank you for returning your postal questionnaire for the activity on referral schemes six months post evaluation. All information you have given is very important in developing a picture of the effectiveness of the physical activity interventions.

I am looking forward to sending you the same questionnaire in six months for the annual review of the scheme and receiving your reply.

Should you have requested a copy of the final report, it will be sent by May 2012.

Yours sincerely,

Kerry Michelle Clarke
PhD student in School of Health

E-mail: kerry.clarke@northampton.ac.uk
Tel: 07793 527966

Appendix B.4 - IPAQ Self-Administered Short Form

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last seven days**. Please answer each question even if you do not consider yourself an active person. Please think about the activities you do at work, as part of your housework and yard work, to get from place to place, and in your spare time for recreation, exercise, or sport.

Think about all the **vigorous** activities that you did in the **last seven days**. **Vigorous** physical activities refer to activities that require hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least ten minutes at a time.

1. During the **last seven days**, on how many days did you perform **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ **days per week**

No vigorous physical activities ***Skip to question 3***

2. How much time did you usually spend performing **vigorous** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about all the **moderate** activities that you did in the **last seven days**. **Moderate** activities refer to activities that require moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least ten minutes at a time.

3. During the **last seven days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ **days per week**

No moderate physical activities ***Skip to question 5.*** (SHORT FORM: LAST 7 DAYS, SELF-ADMINISTERED version of the IPAQ. Revised: August 2002).

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about the time you spent **walking** in the **last seven days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last seven days**, on how many days did you **walk** for at least ten minutes at a time?

_____ **days per week**

No walking ***Skip to question 7***

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last seven days**. Include time spent at work, at home, while doing course work, and during leisure. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last seven days**, how much time did you spend **sitting** on a **weekday**?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

Appendix C.1 - IPA Study Participant Invitation Letter and Semi-Structured Questionnaire

CENTRE FOR HEALTH & WELLBEING RESEARCH

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Tel: 07793 527966

Your views on a Physical Activity Referral Scheme

The purpose of this letter is to invite you to take part in a research study.

My name is Kerry Michelle Clarke and I am a PhD student in the School of Health at Northampton University.

This study aims to find out how to improve the Physical Activity Referral Schemes and current referral programmes available in Northamptonshire.

The study has been approved by the Northampton University Research Ethics and NHS Research Ethics Committee. You can leave the study anytime you wish without giving a reason and this will not affect in anyway your level of care.

I am happy to discuss the research with you and answer any questions you may have.

If you need more information, please contact me using the information above.

Can you help?
If you would like to be part of the research please complete the enclosed questionnaire in the prepaid addressed envelope or contact me via email (kerry.clarke@northampton.ac.uk) or phone (07793) 527966.

Kind regards ☺
K M CLARKE

Please complete and send in pre-paid envelope enclosed.

Name:

Address:

Postcode:

Date of Birth:

Contact telephone No:

Email:

Any additional comments:

Thank you ☺

Study 2: Semi-structured Interviews Template – Non-attendees

Introduction

- Aim is to understand your views and opinions in order to improve services provided
- Consent form signed
- Audio consent
- All information anonymous
- Confidential (within the law)
- Whatever you think is right
- Interview can be stopped at any time
- Information can be destroyed up to one month prior to publication
- Grateful for your time and input into research

Outline process – including guiding questions if appropriate

Home environment – appropriate to interview/or other space to be chosen/appointment

Your views to improve the services being the key concept

Physical Activity (PA)

If I were to say PA – what would you think?

What do you feel about PA?

What PA do you do?

View of scheme

What do you know about PA Schemes?

How much PA is good for us?

Intention towards PA

Do you intend to be part of the PA Scheme?

What is your intention regarding PA?

Why did you not attend the PARS?

Opinions on PA and Health

How is PA linked to improved health?

How is PA link to deteriorated health?

Close
Thank you for your time and input into the research. This information will now be transcribed and the written word to be used for analysis as part of the research study. You will receive a copy of the transcript to verify it is a true account of the interview. Would you like to receive a copy of the final report? If so, please provide your email/postal address.

Developed Interview Questions: (at @ 15/11/10)

Feedback from _____ regarding questions that could have been included.

- What do you know about Physical Activity Referral Schemes available in Northamptonshire?
- Can you describe your experience of being part of an activity referral scheme?
- How could your experience have been improved?
- What went well?
- If you were to design an effective physical activity scheme, what would be important for you?

- What would you consider the barriers to performing physical activity?
- Why did you not attend your initial meeting for the Activity Referral Scheme?
- What are your intentions for your physical activity levels?

- Anything else to add?

Appendix C.2 – Dav's Transcript and Transcript Analysis

IPA analysis – Dav

1. Type transcript - impulsive thoughts recorded in the left margin
   Notes in the left column
2. Read following transcript and audio
3. Read transcript with participant's voice
4. Transcript – listening and making instinctive notes
5. Participant's voice – What is Dav saying?
6. Descriptive – what is being described?
7. Deconstructive – sentence read backwards for meaning
8. Interpretative – what is meant by the statement with regard to Dav's experience
   Reflexive journal
   Emerging themes in the right column
   Identify super-ordinate themes in separate table

Notes	Transcript		Emerging themes
	Kerry: Make sure that's started. Ok. Audio now started ... erm I am with a participant who has been referred from a practice to go to the gym.	1	
	Dav: Yeah	2	
	Kerry: And you got in contact with me to say I'd be happy to be part of research.	3	
	Dav: Yeah	4	
	Kerry: Could you tell me what happened at referral?	5	
Reference to a young girl Did not see the person he had expected to see- he couldn't be bothered to keep the appointment or let me know of the change Experience of induction Young female instructor Measurements taken	Dav: Erm. I went there and urhm they, I went there they erm the guy who was supposed to being doing it was not there so a young girl probably about (phwww) bout 28, 30 came erm took me through all the questions me weight, took me weight, me height erm all them all them kind a questions.	6	Negative induction experience Perceptions prior to induction

Busy gym environment Took the measurements Doing her best but it wasn't working for me Reasons were mounting as to why I didn't fit in to the gym environment It was not what I has expected Initial dislike of the gym Bike used Busy place Did not fit in and did not feel valued Resistance increased – not for me Taking action whilst contemplating change - frightening	Then she took me to the gym but erm it was a bit I was a bit put off by the gym, it was very little, there was loads of people in there. She was like trying, she tried to tell me how to use a bike, (yep) but people kept bumping passed her and erm you know.		
	Kerry: So the environment didn't feel right	7	
Trust established between participant and researcher He is noticed when in public Accident experience Does not like people looking at him when in the wheelchair Paid £10 for induction Perceived that staff did their best within limitation	Dav: Not at all. No. I was in a very serious accident. I am very conscious about people looking at me anyway just when I am out in the street in the wheelchair. And erm. The young girl she tried her best with what she had. You know. Then I had to give her £10.	8	Self perception Previous experiences – motorbike accident Cost of referral

Paid for the experience After all of that, I then had to give HER £10! I need to feel comfortable £10 to experience mental torture!			
	Kerry: Right	9	
Cares about the interaction and getting correct information Reduction in cost by being on the scheme Scheme delivered at reduced cost Externally perceived barrier of cost removed	Dav: And erm I had to give her £10 and then she told me that (space) she told me each, each erm let me get this right for you, each time I come instead of the normal £4.50, I would only pay £1.25.	10	Cost of referral
	Kerry: Right	11	
Included use of pool Referral included use of pool	Dav: Erm but that included the the the pool	12	Referral choice of activity
	Kerry: Right yep	13	
Steam room was small	Dav: and the so called erm (laughing) little steam room.	14	
	Kerry: Okay Its very small	15	
Prefers to exercise without other people Would prefer a gym with less people It was not right for me 1:1 guidance would be more appropriate Desire to start gentle and let confidence develop	Dav: Yeah, but erm, I would you know what, I would have rather no one been there. Well not no one been there, I know they have got to make money and they've got to be?, but erm make it? book a time when the gym wasn't so, there must be a time when people are at work. You know.	16	Negative induction experience Needs of the participant
	Kerry: Feeling conscious	17	

	about going in there.		
Sensed a feeling of frustration Not concentrating because of concern about how others were seeing him Unable to concentrate on young girl because he was looking around and feeling conscious It was an unpleasant experience Searching for others like him – unable to connect to a subjective norm, so did not feel like he belonged	Dav: I was very conscious. I actually I actually was very conscious and I wasn't to be honest I wasn't really listening to the young girl. Because (arghh) I was just looking around me and.	18	Induction experience (negative)
	Kerry: Feeling conscious	19	
Sentences stifled and difficulty in expressing emotions Don't care what others think King Kong type in the gym It was busy with people who could be perceived to be like King Kong Although I try not to care what people think, it's hard not to compare myself with others Overwhelmingly different – expectation to be at a different level than possible Low self-efficacy – can I get over it...no – get me out of here Low self-image – comparison with others	Dav: I am a very upfront guy, I don't really care what people say or think about me but erm in a little in a little environment like that you know where you've got people who think they are King Kong, do you know what I mean, people who think they are King Kong over here and, people going. I felt a bit, and it was just absolutely choca block.	20	Impact of induction experience
	Kerry: Right, too many people in there.. So when you were referred just so I can better understand are you in a wheel chair permanently? Is that	21	
Small home environment Experiences pain in general	Dav: I am as you can see, I couldn't get a	22	Usual life and physical activity

activity Flat too small for wheelchair Pain experienced constantly Preparation for change itself is challenging Requires huge amount of effort to even get to the gym, let alone do anything there	wheelchair in this flat anyway. Erm, I am in pain constantly		
	Kerry: Right	23	
Sweating; wipes brow with cloth Daily living tasks are painful Limited mobility General activity hurts Physical activity is challenging enough without exercise on top! Life itself is challenging	Dav: As you might tell from the sweating. Erm. But when I erm, just put washing out (yep) on the line. And it's just really hurt me. Erm So no no when I go out. When I go out I go out in the wheelchair. I couldn't walk from here to the shops down the road there.	24	Current life experience
	Kerry: Yeah. So you need the support.	25	
Wheelchair would not have been able to fit in gym area Supported at home – identified and accepted restrictions and limitations Access was a real problem	Dav: mmm and funny enough, if I would been in the chair and my partner said this, if I would have been she said to me Dav if you would have been in the chair then you would have been snookered. (Yeah) Cause there was just no way in the world that I was getting in. Have you been up there?	26	Mobility limitations
	Kerry: Which one were you?	27	
Gym identified	Dav: The Mounts	28	
	K: Ok, It was actually in the Mounts.	29	
	D: Have you been up there?	30	

	Kerry: I have since it's been refurbished since	31	
	D: When when when?	32	
	K: Very recently. Last two to three months	33	
Equipment usage instructions in German Refurbishment expected – equipment currently with German instructions – new equipment part of refurbishment The equipment was not fit for purpose It was a foreign experience amplified by potential language challenges – another reason not to go	Dav: Oh No no no. Do you know what, She told me that It's getting new erm equipment in, because it's all German. The equipment she was talking about telling me about was all in German. She said forget she said forget the instructions on the side cause it's all in German.	34	Induction experience Reasons not to go
	Kerry: Right	35	
New equipment expected in the gym	Dav: We are getting new stuff. Bikes and treadmills.	36	
	Kerry: The equipment was not good.	37	
Space too small Equipment ok, just too small	Dav: Not really no, it was okay it was up to par just too small.	38	
	Kerry: Too small	39	
Too small – claustrophobic	Dav: Claustrophobic.	40	
	Kerry: Going back a stage. What was the reason for referral? Why did the doctor say to go?	41	
Had not expected this level of detail Involved in accident Detail of accident Motorbike accident had been a significant part of his life	Dav: Erm, I was erm, I was in a bike crash, I was erm in a motorbike crash in Daventry and erm. I erm I lost I lost my little finger my ring finger and nearly actually lost me arm.	42	Past experience

	Kerry: Okay	43	
Severe injury from accident Detail from accident The accident caused real trauma to his body	Dav: Bike fell on me arm and then bike fell on my leg and snapped my artery. An erm, er it's called the femoral aneurism. Femoral aneurism Do you know what one of them is?	44	Past experience
	Kerry: Not really...	45	
Adds detail to aid understanding – really matters to participant Emphasis by slapping body part Thirteen years of coping with injuries Back injury due to shifting weight from injured leg Valued mobility and wanting to be without disability – though coping has created other injuries which lead to negative health; potential spiral continues and pain increases Physical activity is not a positive experience Choice of either removal of leg or dealing with pain Chose not to have leg removed as only 28 years old at the time After the accident, compensated on other leg and this created back pain Encouraged to get in the pool Getting in the pool hurt Health professional suggested use of pool For 13 years, he suffered pain and they just don't get it!	Dav: Basically, when you tried to graft, the surgeon said we either take your leg away or we can deal with your pain? I would have said take it, but because something if I said there is no way you are taking my leg away you know I was only 28 years of age, I am 41 now but at the time I was only 28, no way that you are taking my leg of me. So? pain. And over the years I have been shifting my weight over onto this leg (Slaps leg). Which has caused me back. So (ok) so I've had to get physio (yep). Erm and all she keeps saying to me is get in the pool. Get in the pool. Get in the pool. She hasn't got a clue cause getting into the pool really hurts.	46	Reasons for change Fears change Advice from health professionals

	Kerry: Lot of pain constantly	47	
Pain limits movement Pain is the problem Rowing machine pulled ligaments really hard Physical activity hurts He knew what his body felt but others pushed to participate in activity that hurt – loci of control shifts and he feels out of control which induces more panic and pain	Dav: Yeah yeah and erm, and erm that is my problem, pain. But the erm I get, I it's funny if you can see yourself the erm ligaments (yep) where it stretches that's not me even she kept telling me you know on the rowing machine and I could feel it pulling like that pulling really really hard.	48	Consequence of physical activity
	Kerry: Too much okay	49	
Has evidence of referral – mislaid papers Told the girl it's pulling too much Had referral notes Concern for confidentiality He knew when it hurt	Dav: I kept telling the girl look Its hurting me, too much. It's pulling too much. You know my doctor I had then to hand don't know what I have put them. My doctor didn't even, This is private isn't it	50	Consequences of physical activity
	Kerry: absolutely totally anonymous and so any information that is recorded on here gets written up your name totally taken out of it never identified back to you	51	
Concern for confidentiality	Dav: Definitely?	52	
	Kerry: Absolutely	53	
Referral information not complete with medical information	Dav: Ok Doctor didn't put everything in the	54	Medical referral

Doctor didn't put everything on the referral paperwork	referral		
Shocked that this could happen	Kerry: Ok	55	
Has medical needs	Dav: What was a matter of me	56	
	K:Yep, so the gym instructor didn't know	57	
Gym instructor did not have full medical information The instructor thought he was referred for acute back pain The fitness professional did not have the knowledge to advise on exercises appropriately. Enhanced anxiety and disassociation from the induction process.	D: The gym instructor didn't even know even a quarter. He just said erm acute back pain. That was it.		Referral to Induction process
	Kerry: And your experience is different to acute back pain	58	
Gym instructor and personal experience were very different Reason for referral was more than acute back pain	Dav: Very much so yeah	59	Medical concern
	Kerry: So when you were referred If we can go right back to there in terms of being referred, what was the conversation at the GP surgery?	60	
Amused that the gym could be offered to him at this stage Did not understand where the referral to gym came from Doctor busy Shocked at being referred to the gym Doctor was so busy that he was unable to listen to what he really needed Gym referral was not on his radar	Dav: (laughing) erm... erm, well my doctor you know must see X amount of people I don't know, 70 people a day maybe. And erm he said, he said I can refer you to the gym. I sort of looked at him I looked at him and thought gym what the? hell are you talking about the gym you know?	61	Point of referral

and not a possibility for him			
	K: What were your thoughts about being referred to the gym?	62	
Factually emphasised on weight by slapping belly area Did not think he could go to the gym Physical activity = pain Unable to lift table Carrying excess weight around belly Encouraged to get in the pool The more the weight on the leg, the more the pain Frustrated by the situation and hoped to find a solution Perceived increase in pain, but thought it would have been a good thing to do for someone else	D: What are you talking about fella. The gym I couldn't lift you know couldn't lift this table if I wanted to I mean and erm, and erm because I've never had this weight before (slapping belly) not ever, he said the best thing for you, he had my interest at heart. He just kept saying to me go into the pool, go into the pool, go into the pool as much as you can. The more pressure I put on my leg (i.e. as in walking), the more pain I get. I didn't know that on a bike one of them what do you call them bikes?	63	Perception of being referred
	Kerry: Is it like an exercise bike?	64	
Repetition – for emphasis Recent experience of bike at physio – linked into what referral was about Exercise bike takes pressure off leg and thus did not create more pain Connection that must be what doctor had meant By experience, he thought the exercise bike might be a solution Delighted to have gained clarification why the referral was	Dav: Yeah exercise bike. On exercise bike it don't put no pressure I didn't know that until I had physio about 2 weeks ago. So erm, when he first when he first said to me go to the gym I thought what on earth are you talking about. But when I used these exercise bikes in the physio, I thought yeah, that must have been was what he was talking about, what he was talking about.	65	Potential physical activity solution

given			
	Kerry: Type of exercises	66	
Has coped with limitation and pain for a long time Type of exercise important Had problems for a long time Relationship with doctor Taken aback by referral to the gym Even though he had a great relationship, he was shocked by the referral and did not think it was appropriate Fondness for GP – usually meets need of participant; good history and loyalty Potential to harm the relationship – did the doctor really have time to listen to his needs? Trusts GP	Dav: Yeah type of exercises. You know I've had this problem for an awful long time. And erm, he was just like, he said, he he got a relationship where he is just like hiya Dave? you know...if there is something wrong with me like if I need cream or something like that ....he'll give me them you know, we have got brilliant relationship with him. Been with the surgery for about 28 years. Since I left Liverpool. And erm, so I I the actual referral took me back a bit.	67	Relationship with health professional
	Kerry: So you Weren't expecting it.	68	
Unexpected referral to the gym	D: To be referred to a gym, no	69	Referral process
	K: What were your thoughts when you kinda left the surgery having been referred to the	70	
	Dav: When I left	71	
	Kerry: Yes, When you walked out of the appointment and you had	72	
Not ready to go to the gym despite being referred to the gym by the GP	Dav: Go to the gym what are you talking about?	73	Referral process

	Kerry: What what was it that you felt you couldn't go to a gym?	74	
Had a perception of the gym environment	Dav: When I think of a gym.. When you think of a gym, What did you think?	75	
	Kerry: I used to work at	76	
Classic picture of what gym is – not really interested in what he thought even though he asked the question Had a perception of the gym environment Gym = treadmill, exercise bikes, and weights	Dav: I think treadmill, and exercise bikes and weights.	77	Perceptions of the gym
	Kerry: I think you are right with the idea of the	78	
Identified what he could not do at the gym Weights were a no no Didn't know about exercise bikes prior to physio appointment 2 weeks ago Pain can be a killer Recent experience at physio – potential option of using exercise bike Associated exercising with pain Taking weight off leg prevents pain Pain experienced was extreme Felt that the gym was not going to meet his needs and not alleviate his pain	Dav: The weights are an absolute no no for me, erm erm to do weights absolute no no. As I said about two weeks ago at physio? didn't know that exercise bike didn't take your full weight ....that it doesn't stops me from feeling pain. (?) exercising and er pain can be a killer you know.	79	Relationship with physical activity Connection of pain and physical activity
Felt for participant – level of pain that he experienced	Kerry: Pain stops you doing physical activity	80	
Pain is a barrier to PA Pain is pain	Dav: Yeah, pain is a pain	81	Limitations

	Kerry: Yeah	82	
Emphasis on pain	Dav: It really is pain?	83	
	Kerry: Did the GP acknowledge that you weren't didn't want to do the referral	84	
Chose not to share what he felt about the GP's referral Did not tell GP that didn't want to go	D: I didn't let him know	85	Relationship with health professional
	K: So when you left He or she assumed you were going to the gym	86	
External motivation: expected to work	Dav: Yeah	87	Referral process
	Kerry: Then you followed through and went to the first appointment	88	
Attended one appointment External motivation: worked for one appointment	Dav: One appointment	89	Attendance
	Kerry: One appointment	90	
Had to let go of expectation … pwhhhh Wow! a strong statement Was really uncomfortable with his situation Attended induction Did not feel comfortable Reinforced own feelings of not accepting being disabled Hates people seeing him in wheelchair Has not dealt with being disabled Amplified personal insecurities and was an experience that increased resistance to change	Dav: To one appointment. I thought pwhhh, The first, maybe its pride because I went, erm like I told you it's very small, claustrophobic, I don't like at the best of times even my loved ones people seeing me like this. Hate it. So when (?) I have never really dealt with the erm fact that I am disabled. But I am. I don't like being and I have never acknowledged myself as being disabled.	91	Attendance Perception of self
	Kerry: So the going to gym massive hurdle, but	92	

	you still went.		
External motivation: worked on first visit – activated the contemplation/preparation stage	Dav: Yeah?	93	Commitment to referral
	Kerry: But you still went	94	
Scarring added to the barriers preventing him from going to the gym Swimming was a big challenge Conscious of scarring when getting into pool Made efforts to attend Going to the gym was a big thing Mentally, a lot of energy was used to get himself there	Dav: Yeah It's a very big thing. It's a very big thing to get in the pool. It's the scarring I've got. Awful lot of scarring. Scarring that you can see. Erm yeah it was a big deal for me to go to that gym.	95	Experience of being physically active Perception of others reaction
Wanted to reflect that he had taken step forward	Kerry: Went to appointment and felt it just wasn't right for you	96	
Begrudged paying £10 £10 paid for service Induction process: weighed... and £10 paid Happy to invest in the right service	Dav: Went to the appointment and the young girl weighed me and done all that carry on she said then hmm she said I need £10 off ya and so I gave her the £10 and erm she said to me? and will show you what you can use	97	£10 fee
	Kerry: Yeah	98	
Appreciated the reduced cost Reduction in cost of use of gym Did not attend after induction Reduced cost to use gym When he did not go he received a phone call Frightened to return and avoidance begins	Dav: Erm instead of £4 or £4.50 you only pay £1.50. So I said yeah Sounds good. But erm, She Kept phoning me, because I didn't go again	99	Referral cost Communication with leisure provider
	K: Did try to get in contact with you	100	
Persistent leisure centre Change talk – "I do need" Can connect to consequence if PA does not increase Gym instructor called after no show Needs to shift weight for back's sake If back is injured, mobility will be further limited Phoned 5 times Recognised the need to shift weight for managing his back	D: Yeah phoned me about 5 times and uhm erm I do need to shift some weight, for my backs sake. Cause I mean if my back goes that is me buggered, that's me absolutely snookered.	101	Perception of physical activity Follow-up from leisure centre Ambivalence

Ambivalence – if back is injured whilst exercising, consequence can be severe Equally need to shift some weight...by being more active... Increased anxiety about being physically active and increase fear of what if... emphasised on the challenges of physical activity			
	Kerry: With your connection to physical activity. What does physical activity mean to you?	102	
Barbells under sofa Contemplating change and connecting back to leisure centre Uses arm weights Wants to be fit Seen lots of pain relief specialists May contact the gym Physical activity = using arm weights Wants to be fit Considering going to see her at the gym again if the gym has been refurbished The gym could be a good next step, the pain relief is not working and I need to do more than arm weights Hopeful – contemplation about putting head above the parapet again	Dav: Arhhh kidda. (Space) Erm All I do is like I am doing now? using arm weights? for these muscles just want to be able to be fit. But I've been to see pain relief doctors, and it's all you know the same thing. You've got the choice. But erm, you say that gym has been refurbished I might actually go and see her again actually.	103	Current physical activity Re-engagement with referral process
	Kerry: Ok. What does it mean to you in terms of physical activity? What is physical activity for you? Saying even going to shops is a challenge you need a wheelchair.	104	
Facilities not suitable for participant – basic challenges to be mobile in own environment Hassle getting the wheelchair out Not wanting to open up too much – diverts to a question for me Uses stick rather than wheelchair	Dav: I don't need. I can go to the shops, It'll hurt going to the shops without using the wheelchair. It means getting it out of there getting it out of that	105	Limitations Physical activity in general life

Process of getting wheelchair out of the cupboard to go to shops is tedious Easier to use still...= pain = getting down Pain is restrictive Willing to work through pain – necessity to be mobile and to hold onto little bit of self-respect and mobility	cupboard there and getting it out of the block, then getting in it, going down the shops and coming back and so I (small laugh) I just bite the bullet and go on my stick. Erm, but then just in pain. It gets you down, pain. Have you ever been in pain?		Pain
	Kerry: Not to the extreme that I am hearing that you have experienced.	106	
Not sure if he wanted to connect or divert attention	Dav: Have you ever been in pain?	107	
	Kerry: I have had pain for sure	108	
Sensing depression signs Pain affects mental health Pain gets you down	D: I mean, pain gets you down	109	Pain and mental health
	K:Feeling sad from the pain	110	
Physically demanding – accident was unexpected and could happen to anyone Wakes up in pain Used to be occupationally physically active Had physical job for 12 years What it is like to wake up with pain...want to pull duvet over head What life used to be like He used to be physically active	Dav: You just feel, just want to wake up honestly there have been days where I have woke up and just thought just want to put quilt over my head. Used to work out on the rigs for twelve years, I was a rough neck for twelve years.	111	Current life experience Past life experience
	Kerry: What is a rough neck Dav?	112	
Unexpected accident changes course of life Being hit from behind wrecked	Dav: Just making sure the drill bit, big massive drill piece is in the right place and on properly. But erm Somebody hit	113	Current mental state

his life My life was ok before the accident Questioning - why bother with life?	me from behind (space) and wrecked my life. But erm		Quality of life
	K: That was whilst you were on the motorbike	114	
Accident not expected – hit from behind Encouraged by others to get a scooter Pride a barrier? Everyone encourages him to get a scooter Pride stops me getting a scooter Would prefer not to fail again – sense of being at the last hurdle and yet first one not yet conquered	D: Yeah they hit me from behind in Daventry. I am not come to erm everyone says to me just get one of them scooters get a scooter man you know everybody everybody?. You know Pride, it must be. I don't know	115	Perception of support and mobility aids
	Kerry: In terms of physical activity if we were to say physical activity is being more mobile or doing physical activities. What do you intend to do in the future? You mentioned you might go back to the gym.	116	
Does not plan Sense of aggression in voice Does not like having no plans Frustration My own reflection that this is sad – is life worth living? Does not help himself Does not like people seeing him in the wheelchair Situation creates rage Currently no plans Going to the gym would be doing something for himself Experience of being in a wheelchair and people seeing him is horrible Physical activity is not a priority right now – he felt like a failure after being pushed into referral	Dav: Do you know what, to be totally honest with you I have not got any plans. I sound like a proper sad sack don't I. But erm? In my head I have not got any plans. In my head, I have not got no plans. (Yeah) I am sitting off to be honest with you like an idiot. I am not doing nothing for myself. There are things I could be doing things for myself, (i.e., going to gym and getting out in the wheelchair). Just people seeing me in that chair, just Arghh, arh it makes me rage honestly, horrible.	117	Current quality of life Self-perception Intentions regarding physical activity

Avoidance of the horribleness of it all Felt stuck – he knew things had to change – but pain and the shame of being in a wheelchair stopped him going forwards	20.33		
Complex reflection Exploring for more depth of how he is interpreting this experience	Kerry: So you don't identify with who you are since from before the accident	118	
Prefers to shut himself away than be seen Family wants to support – but he resists the wheelchair Was active in the past Does not connect with being in a wheelchair Family members ask him to get in the chair Owing to wheelchair situation, does not want to go home What it is like being in a wheelchair compared to before the accident – impact on going home Before the accident, he was active and now he was ashamed to go home because of the wheelchair Ashamed of wheelchair Isolation rather than dealing with underlying issue of pride and shame of being in a wheelchair, even though it was an accident - does he feel partly to blame?	Dav: No I was a very active lad. I was really active. Being in a wheelchair nah just not me. It's just not me at all. I get in it and my partner just. Like my brother, I come from a very big family 12 and they say get in the chair? get in the chair. I come from Liverpool, erm haven't been home. Have been home once for my Mums funeral. But haven't been home since because I'm in that chair.	119	Relationship with family Barrier to physical activity Experience being in wheelchair Social skill
	Kerry: How other people see you is really important to you	120	
Disappointed with himself Even though he was raised not to care about what other people think, he did care Shame at feeling the way he does Cut-off from family and not understood Lonely Being ashamed was against his values – affected his self	Dav: Yeah yeah Shouldn't be. Should know better than that, I was raised. I was raised better than that. Not to care what people think. But erm	121	Mental state
	Kerry: Sounds extremely traumatic	122	
Agrees it has been traumatic Feels for himself and aware of	Dav: Yeah it is, It is kind yeah it is	123	

challenges Appreciates being listened to			
	Kerry: You've had time from 28 to 41 of all of that experience. In terms of the physio. Can you tell me what you are getting from going to the physio in terms of physical activity	124	
Positive experience – accepts guidance from GP Physio helped Was down when he went to physio How the physio helped when he was down It was the right time to see the physio An instant bond was formed with physio	Dav: Oh the physio helped me. The physio, she was amazing she was. She when I went to the physio, I am not exaggerating here, like I was sort of down.	125	Relationship with physio
	Kerry: Yep Yep	126	
Fear of back injury Exercises given for back Potential injury with slipped discs Exercises helped his back, but he slipped; fear of potential consequence if discs did slip Fear of what if...? Waking up in pain Health professionals not listening to his concerns – frightened about health becoming worse Disassociating frustration He was close to breaking point – fed up with not being listened too Professionals should listen to the level of pain; when he wakes up he cannot do anything Disassociation with GP Not able to voice concerns to GP Frustration when professional has not read file in detail Lost track of where he was going with the statement	Dav: She gave me three exercises to do to do erm repertoires every three hours which I did. It straightened my back out, but I slipped. (okay) Not they haven't slipped yet, discs, 2 discs in the bottom lower back that have come out of their sack of fluid, each disc has got a sack of fluid, fluid burst, so they are on the verge of slipping. And if they do slip, a slipped disc is? but she said to me ermm, I can't see anything else I can do for you and you know....she said to me so long as you, these professionals need to understand that ermm, like when I wake up she said to me that ermmm, she said to me when you wake up and you are in bed do your exercises. I thought when I wake up I can't do anything when I wake up. What are you	127	Benefit and consequence of doing physical activity – ambivalence Experience with health professional

	talking about? Have you read my file or what arghh? You know but erm obviously I didn't because I am not that kind of guy. But erm..		
	Kerry: you sound very determined, if you know that what you are going to do will help you	128	
Shock He respects his doctor and is grateful for their relationship Repetitive message – go into the pool Now a drug addict for pain relief Swimming highly recommended by health professional Respect for doctor Pain requires drugs which are addictive Devastated that he is now a drug addict because of the extent of pain relief required to get through the day	Dav: Oh yeah, if er all my doctor seems to say to me is get in the pool get in the pool. He helps me immensely he does he is a cracking doctor. But erm, all I get off him is get in the pool, get in the pool. And it's all down to my erm and see the drugs you get for pain relief are very very very addictive. And erm, I am drug addict now. I am a drug addict now.	129	Current circumstance due to pain Relationship with health professional
Reflected calmly	Kerry: To support pain relief	130	
	Dav: Yeah, now erm if you're are from this town you should know?	131	
	K? No I don't know?	132	
Support received for drug addiction To get away from the pain, he goes to this service One problem now escalated out of control	D: Substance substance misuse service, CAN have you heard of CAN same? Well I have to be with them now..because of the pain relief	133	Support for drug addiction
	K:Yep, but became addicted to the actual	134	
Them people – disassociation Linked to a group of people he'd prefer not to be associated with By circumstance, he is now	D: Not that there is nothing wrong with being? being a drug addict. There is, but erm I've now got to deal with	135	Perception of self and others

associated with drug rehab services Stated he was different from the druggies he saw at the drug support services Getting help with drug addiction – forced by circumstance	them people.		
Came back to the subject of referral	Kerry: Sounds that referral was just something you just went kinda along with and that you just felt it wasn't the right environment	136	
At that time, the referral was not appropriate Timing of referral was wrong It might be the right time now	Dav: It was at the wrong time	137	Thoughts at time of referral
	K: And wrong time was it about year ago?	138	
	D: Yeah	139	
	Kerry: Yeah considered perhaps going back that might be something you want to do in the future	140	
Does not want to be hassled Feels pressured to be part of scheme Leisure provider made contact after no-show Creates a feeling of resistance to attend	Dav: Yeah but keep hassling me people in gym. They are on your case.	141	Follow-up referral process
	Kerry: What do you think when they are calling you. That is part of the scheme for them to stay in contact. What did you think when they kept trying to get hold of you?	142	
Clear details – feels like they are bothering him, even when on holiday Unwanted calls Unwanted follow-up calls received when on holiday Understood it's their job but did not want to be bothered Potential added barriers to attend the gym – unwanted attention Did not know why they were bothering with him	Dav: We were in Scotland, my partner is Scottish. We were in Scotland. And erm I understand it's their job. Erm, they phoned me about 4 times.	143	Follow-up referral process

	Kerry: Right	144	
A longer time period between calls Leisure provider suggests calling after 6 months to review This may be a harsh reflection Preparation time to make mental adjustment He was not sure if they had given up and were letting him off the hook	Dav: And in the end they just said, what if I just phone ya in six months and see how you feel then. At the moment to be very honest with you I am being very cruel and very upfront	145	Pause referral process
	Kerry: Very honest	146	
Trusts the relationship with researcher Acknowledgement of trust and wanting to share the lived experience Letting people in is a scary process	Dav: I am being very honest which is very weird for me I don't really let people know my business. But erm.	147	Letting people in
	Kerry: Really appreciate	148	
Disclosure; prefers to keep himself to himself Receiving support from health care services Knowledgeable about drugs and potential side effects – related to home environment Not worth the risk of turning into full on drug addict Currently experiencing low mood and offered drugs for pain relief – did not want to take that amount of pain relief because of the potential of addiction. Looking for help but feels trapped, looking for advice and support, knows the drug will help with pain relief, but left the druggie world behind and does not want to become part of the culture he saw before Currently, experiencing low time – considering alternative strong drug for pain relief. Perceived the amount offered to be too high – doctor keen to prescribe Frightened about the future	Dav: That's cool. Erm, I am very very very down at the moment. Probably the lowest I have ever been. And erm not that I am gonna cry or kill myself or something at the moment would never do anything like that. As far as my pain relief goes, I was talking about it with my counsellor yesterday, my case worker. There is a drug called methadol which is? very very dangerous drug. Went to see a pain relief doctor. Copious amounts that he was wanting me to take was outstanding! Are you having a laugh fella? I have seen them you know, I come from Liverpool I come from? Place is full of druggies.	149	Looking for help Mental state

Medication could spiral out of control Feels cornered – not sure what to do for the best – period of turmoil	Druggies everywhere you look. Know what this drug does. I seen it with my eyes what it can do. And erm the amount was just so, not worth it. It's not worth it. (Space) What he was offering me arhhh was so not right, was so, you know the way doctors just go like that do ya, what's that called?		
	Kerry: Sounds over the top err..prescribed	150	
Challenging that the pain is so severe Counsellor supported the use of drugs for pain relief. Consideration to accept drug because of the level of pain Unsure about what to do	Dav: But I couldn't believe the amount, said to case worker yesterday and he said but if that will deal with the pain then?	151	Looking for support
	Kerry: Sounds like a battle with the pain	152	
Emphasis Acknowledges the battle being experienced	D: Yeah, that's what it is yeah	153	
	K:..how does physical activity impact the pain, will it make it worse or better?	154	
	D: If	155	
	K:By being more physically active	156	
Physical activity increases the level of pain Increase physical activity – Increase pain	Dav: Makes it a lot worse	157	Relationship of physical activity and pain
	Kerry: So the actually pain gets worse when you are physically active? Any benefits for you to be physically active	158	
No immediately identified benefits of doing physical activity Instant reflection – no benefits to	Dav: No	159	Thoughts on physical activity

being physically active			
	Kerry: So, can I ask you a straight question why would you want to go to the gym if it makes you worse	160	
Aware of excess weight around belly area and core Links physical activity to weight loss	Dav: Because of this (slap belly)	161	Reason for engaging in physical activity
	Kerry: Purely for your weight	162	
Linked weight to sore back PA benefit: relieve strain from back Extended link to compensatory soreness	Dav: For my back	163	Reason to do physical activity
	Kerry: By going to gym, lose weight and help support back but the pain	164	
Severe level of pain Extreme pain	Dav: The pain is erm horrendous	165	Current physical state
	Kerry: Willing to go through pain to lose weight	166	
Stalling – not ready for change Not ready to go right now – may be part of future... Without being pushed – in his own good time	Dav: Er, not now at this moment but soon yeah	167	Preparation for change
Not currently ready to go through with physical activity – but soon	K: Ok Something you are potentially thinking about	168	
When doing physio, the pain is severe, to the extreme of affecting mobility She looked harmless though the exercise she gave created a lot of pain Physio increased pain to point of limiting mobility, even though she	D: Yeah yeah, the physio nearly killed me. She was only about big. (laughing) She absolutely killed me. Could hardly walk. Honestly I was like argh god	169	Thoughts about physical activity Pace of physical activity

was small in stature It needs to be the pace he can maintain so that quality of life is not reduced to zero!			
	K: Massive challenge to do physical activity	170	
Shocked again Would prefer not to have pain at the cost of losing a leg Harsh reality – would rather be without leg than continue with pain Reflection of whether he would be better off without a leg to reduce the pain, restrictions and improve the quality of life He felt he made the wrong choice and would now prefer to be told what to do – did not trust himself to make the right choices for the future	D: Erm, to be honest with you, to be brutally honest with you, they should have taken my leg away. They shouldn't have given me a choice.	171	Choices Quality of life
	Kerry: Yeah	172	
	Dav: You know?	173	
Able to respond without emotion	K: So by taking your leg away you had to?	174	
Reflecting on what life could have been With a prosthetic leg, he would be much more active If he had made the choice, it would be incredible, he would be able to perform normal activities A prosthetic limb would enable him to be much more active He wants to be normally active – desire	D: If they had took my leg away I would have been. I would be as active as you are today. I would have been I would be as active as you are today because the prosthetics that they have today are absolutely incredible they are incredible. I mean they are incredible, Wouldn't believe wouldn't believe some outstanding some of them.	175	Desire to be physically active
	Kerry: Range of movement	176	
Values the potential of prosthetic limbs Has high regard for quality of prosthetic limb He felt his world would change if he had that level of mobility	Dav: Got their own ligaments they have got their own? out of this world some of them?	177	Desire to be physically active

again			
Looking to settle participant	K: Sounds like you made a choice at that point that was right for you at that point	178	
Accepts at that point a choice was made	D: Yeah it was	179	
	K: Been through a journey physical activity sounds like it makes extremely painful extremely sore and that a referral was not appropriate at that time	180	
	D: No	181	
	K: If you were to say what physical activity is to you. How would you sum physical activity up?	182	
Takes time to process what physical activity is, not identified with...though searching for a connection Upper body can perform limited physical activity; he is able to use barbells to develop strength Physical activity limited to lifting barbells to strengthen arms Not keen on physical activity options because of severe limitations	D: (Space) Erm (Space) Erm (Space) bar bells, I build my arms up	183	Current physical activity Perception of physical activity
	K: Still doing stuff	184	
Limited physical activity Can perform physical activity when sitting down Not good enough	D: Arh yeah, when sitting down	185	Physical activity limitations
	K: Yeah you are able to	186	
Why has he not opted for an automatic wheelchair? Doing arm exercises enables him to propel a manual wheelchair Using wheelchair is challenging Moving a wheelchair along is hard The priority in terms of physical activity is to develop strength to enable use of wheelchair	D: Build my arms up, bar bells under there. Build my arms up, have got to when I'm out in the wheel chair. I am 15 st. It's very hard. It's a manual wheelchair not erm automatic one.	187	Link physical activity and quality of life

	Manual, self propelling.		
	K: Sound physical activity helps you to get mobile as you can be	188	
Wants to know if other people see not going out in wheelchair as pride... Seeks to check if researcher feels using a wheelchair is a matter of pride He wondered whether he was just being stubborn for the sake of it or if he had a reason to feel like this	D: Yeah, and I would you say that's pride. From, I am asking you a question as a person that does not even know me	189	Seeking guidance
	K: Person to person just met you	190	
	D: What would you say about pride?	191	
Side step	K: I would say that you have had amazing life experiences that I cannot relate to.	192	
	D: Yeah	193	
	K: Because I have never experienced that. Something that I think is extremely...brave to even invite me in your house to talk about it?	194	
	D: Yeah ... erm	195	
Answered the question with my honest reflection and offering of	K: So is it pride? I would	196	

hope of change	say they are the right decisions at the right time but things do change		
Accepts that he had had challenging experiences that others may not relate to Accepts that decisions were made at that time Mention he did the best at the time but is suffering because of those decisions	D:Good way of putting it	197	Choices and consequences
	K: But things do change	198	
Uneducated people are unable to understand. Experience of other people who do not understand An example of how people perceive him He is compared to others with disabilities without knowledge	D: Good way of putting it. Yeah. You see people, uneducated people, I have got a classic. My sister in laws mate has got a quadriplegic quadriplegic child what do you call them?	199	Misunderstood
	K: I know what you mean Dav	200	
Other people including relatives do not understand his condition and that is frustrating Experience of being shunned for being in a wheelchair by family/friends People don't understand him and it makes them angry He wants to fit in and feel part of his family again Enraged	D: A quadriplegic child one of them. She has got one of them. She said to me. She saw me get out of the wheelchair and go into the house. She looked at me and said to me. What are you using that wheelchair for? My baby can't even walk and he is nearly 19?. I said I have different disabilities to your? whole different ball game with me. She was so pissed off with me? Excuse the language but she was so? With me for being in a wheelchair. You get uneducated people like	201	Misunderstood Isolation

	that?		
Able to respond calmly – keeping the discussion at an appropriate level	K: Sounds like you don't associate with your own disability, that in itself is a challenge	202	
Goes back into rage The pain is the limiting factor Unfairness of people who get support for being on sticks but are not suffering the pain Is sick of being like this – something has got to change!	D: People with no legs, they ain't got no pain. With err sticks, was bombing around everywhere but Davy he can't I am in pain feel like going, arghhhh I am in pain	203	Current mental state
Honest reflection It's the pain more than the disability that is restrictive	K: Can hear a lot of frustration, (it's horrible) from someone knocking you off your bike right the way through	204	
Personal detail about the trauma of being in a wheelchair and how family and partner relate positively to him to encourage him to use the wheelchair He used to blame the accident but family including his partner have supported him Is unable to enjoy good weather because of exertion required to propel the wheelchair. Accepts is it challenging; gym is not the right option for him. Expecting hard time, but did not see gym as an option in future. How family – Mum and Big Mum responded – encouraged to use wheelchair. Supported by partner – not expected	D: Er do you know what I used to say I used to say that he ruined my life. He hasn't ruined my life My Mam and big Mam used to say me? Mum and me Nan, Big Mam (Kerry laughing) me Mum and me Mam I actually had a slap off my mum for not getting in the wheel chair she was right too and the fact that my partner stayed, I didn't expect that. She will definitely she's definitely? But erm, I do feel like, erm remember when we had that lovely weather really lovely weather, well it was horrible weather because I couldn't go out in the wheelchair when I did go out in the wheelchair I was sweating like. It's all erm, I am in for a hard	205	Frustration with general mobility Quality of life limitations Perception of gym Support from others

Unable to enjoy good weather because of sweating when using wheelchair Expected his world to fall apart – it hasn't, but it's not a pleasant experience and he is unable to enjoy the simple pleasures Want to be physically active, but the gym was not the answer for him	time but, that gym just wasn't right for me.		
	K: In terms of sounds like people around you. Like your saying partner that stayed around and your mum that was supporting you to do what she perceived was right that you have got that support there. In terms of the gym how could the scheme be better, how could the scheme have been improved for you?	206	
Able to articulate what he could do – swim in the pool not exercise in the gym Concerned that it will be taken away – valued what he had been given The girl at the gym expected him not to come back and he is expecting them to cancel his membership Girl – expression or emphasis – not professional or mature enough to meet his needs The girl that did the induction process was giving signs that she did not expect him to return. Expected consequence of not going – cancellation of membership that entitles him to a discount. Thought the gym did not value him and he wanted to opt;	D: I mean, I think she I think the girl was erm seeing me as this guy was not going to come back. I could sense, I am very quick with people, could just tell she was saying to herself this guy ain't gonna come back. This guy is definitely not going to come back. I said to her at the gym no, but pool yeah. (Okay) But, I think what's going to happen now, which wouldn't blame them, if they take my card of me and I'll have to pay full whack. Do you know what I mean.	207	Possible physical activity Change talk Experience at induction Consequence for not going Control of change

worried that he will not be allowed to continue when he felt ready Wants to control the pace of change and evolve step-by-step Met the perceived expectation of leisure provider People write him off			
	K: In terms of, you would go back to the scheme to use the pool, that'd be something you'd think about doing in time.	208	
Positive reflection of referral Would consider a referral to a pool Would use the pool Had a solution	D: Without a doubt. To use the pool year, Yeah, definitely	209	Possible physical activity
	K: Is that because the doctor said it'd be good for you?	210	
Wealth of experience He knows what is good for him and has a lot of experience working with different doctors Acknowledges going to the pool is a brilliant idea for himself and also from a trusted health professional He can best manage his condition and know when things are right for him Given the opportunity, he will embrace the right thing for him Whilst respecting health professionals, he knew his own world best!	D: No? I know what it does for me. If a professional says to me try it, I will try it believe me when I tell you I have had loads of doctors looking after me. Doesn't know what he is talking about. Sorry. Have been with doctors, Wow wow, he has hit the nail right on the head. (clicking fingers) like that, But going to the pool was a brilliant idea.	211	Self control of behaviour change Relationship with health professionals
	K: Going to the pool	212	
Going to the pool is a brilliant idea	D: It was an absolute brilliant idea	213	

	K: How is the pain when you are in the pool?	214	
Able to link to previous form of fitness training Remembers the feeling after circuits; now has normal pain and the additional pain limits his mobility. Pain enhanced when out of the pool – to the extent of limiting mobility further Accepts it will hurt whilst getting back into physical activity – more so than normal The pain is rational when he is in charge of the activity	D: When I am in the pool it hurts. It's when I get out of the pool. But I think when you do circuits then next morning. You know. I was in my normal pain I was in my normal pain but I had that pain on top. When swim, used muscles that you never knew you had, you know I got out of the pool and oh my goodness me could hardly walk.	215	Previous physical activity experience linked Consequence of physical activity
	K: In terms of how other people see your leg scarring	216	
In a process of acceptance Considers himself to be a giving person Acknowledges he is a kind person; starting to think it doesn't matter what other people think about his scarring Starting to feel that he could get over the hurdle of people seeing the scarring Knows he is a good person inside He knows himself; he is kind and other people do not always see that before they see the scarring Self-reflection of being a good person may build inner faith that other people's opinions and perceptions are not as important as getting in the pool – intrinsic self empowerment – potentially to reduce impact of barrier – change talk Inside, he is screaming to get out and be with people again	D: Yeah, I have, I do have horrendous scarring but do you know what I am coming around now to thinking you know what to hell with other people. If they don't see me for who I am. They don't even know me. I'd give I'd give, I'd give people my heart? You know? I don't need no counselling to know that. 40:00	217	Change talk Barrier reduction Acceptance
	K: Sounds like physical activity like swimming where there is pain is a challenge but you can see benefits of losing weight	218	
Knows what he can do Able to recount with humour When exercising on the bike it didn't hurt as the bike took the weight	D: Yeah, it seems to be seems to be anything that I am not putting my whole weight on. Good for me. Couldn't believe,	219	Self awareness Exercise without

Exercise that is not creating more pain Encouragement from the physio Experience of being on an exercise bike It took some persuasion to get on the bike – once he did, it was ok There may be a solution for him	she said to me get on the bike. She is very (laughing) She is honestly, she said to me get on the bike, you know just try it just try it, little Geordie. I said it'll hurt, it won't hurt, it won't hurt, she knew what she was talking about, I got on the bike and didn't hurt because I wasn't putting my whole weight on my leg.		pain Valued support Potential solution
	K: Sounds like you have been brave (phone rings) if you do need to get that Dav, do	220	
He'd invest in equipment that would be useful for physical activity without causing pain Wants to buy a bike because no pain is caused by exercising on the bike Is desperate to find something that enables him to do PA without increasing pain	D: And it didn't hurt, and it didn't hurt at all. The fact it didn't hurt makes me want to buy a bike	221	Desire to perform PA
	K: So You really want to do physical activity	222	
Starting to express the reasons to live Wants to contribute to life and share experiences; relates to partners profession of being social worker How is he currently feeling about himself? Partner's employment Aware that he has a lot to give Would feel like he has his life back if he were giving to others By being more mobile, the quality of his life will increase as he will be able to integrate back into community	D: Yeah, I have (hesitates) to do something to get my life ... back, because I have got a lot to give. Erm I've got my partner is a social worker. Erm and I was hmmm erm I've got a lot to give people especially now from what I have been through	223	Value of life Impact of physical activity and quality of life
Affirmation	K: I imagine a huge amount	224	
Currently struggling Reflection of past experience and	D: I have been to hell and back to be honest with you but erm I am	225	Challenging mental state

where he is know It's been a traumatic experience that he is still experiencing	still lagging		
	K: What impact will physical activity have for your life, your quality of life	226	
Link of physical activity to something participant would value – embarrassed about not being able to easily use the wheelchair Being physically fit will enable him to use the wheelchair without sweating How physical activity will impact his wheelchair use This is a new experience for him Possible benefit identified	D: I think it will Erm, I think it will I think it will erm make me be able to use the erm wheelchair properly erm without sweating, you know I've never been, I've never in my life had a belly, not ever.	227	Benefit of PA Impact of being physically active
	K: A way to keep fit, imagine it is extremely hard	228	
Receives unwanted attention when in the wheelchair What it is like to be in a wheelchair People feel sorry for him when they see him in the wheelchair and think he needs them Hates experience of being in wheelchair and reaction of others	D: Honestly It's infuriating. And when you are in a wheelchair everybody, everybody everyone looks at you, it must be human nature, they go oh, not arhhh some of them do, some of them do (laughing) but kneel down, kneel down for you. What are you going to do propose to me or something you know what I mean	229	Other people's perceptions and reactions
	K: Your not wanting the extra attention just want to be you	230	
Wants to be respected What happens when people speak to him in a wheelchair	D: Don't come down to me	231	Self-worth
	K: Yeah (laughing)	232	
Expression of his experience – "That's what it is like" Looking for understanding It's an experience that others	D: you know what I mean, that's what it is like	233	Being heard

may not know about			
	K: Funny if you ever said that to someone, want to propose to me	234	
	D: Yeah, erm but	235	
	K: Make it easier to be more mobile	236	
	D: Yeah	237	
	K: In the sense of using the chair	238	
Acknowledges the level of support received from partner Appreciates support from partner, though he can be horrible when in pain What it'd be like to be on his own Can't believe partner stayed with him Effect of pain on mood The pain and mood that follows may drive people away Reliance on others important – fear of isolation because of pain and the resultant mood change	D: Think if I was on my own. I think I would be bang in trouble if I was on my own. My partner,? blew my head away to be honest, can believe she stayed with me because I can be horrible when I am in real bad pain, horrible to her pain puts you in a horrible mood, when you wake up and one foot on the floor and you just go arghh	239	Support from partner Pain and mental health Impact of pain
I am sure I'd be the same if I was experiencing that level of pain	K: Sounds horrendous	240	
General activity ... General activity such as moving head can create pain Pain when washing the dishes Intention to live active life and do general tasks – stopped by pain	D: I was, I was washing the dishes what 5 days ago, turned my head, honest had to stop	241	Life and pain; pain and life
	K: Yeah	242	
Pain stops him from doing general activities Consequence of pain	D: Had to stop, went arghh	243	Pain
	K: Loads of fear been built up over the pain	244	
Concerned about level of pain in back Fear of pain What if… ?	D: Pain shot right across my back. Paranoid with it.	245	Fear of increase injury

Needed to be told, though did not continue Needed encouragement	K: Yeah, paranoia actually played out, because you were experiencing pain, it took young Georgie Georgie lass to say get on the bike (laughing), and a doctor to say go swimming get in the pool.	246	
Sense of loss Expects membership to be cancelled Concerned that he will lose the opportunity– added fear Not good enough Visited the gym only once Going once was not good enough, using pool not good enough – consequently, membership could be cancelled	D: Yeah I have only been once, I think they will take my membership away, but to be honest I wouldn't blame them if I am only using the pool you know what I mean.	247	Positive value referral Referral expectations
	K: Is cost a barrier a barrier as well Dav in terms of going to the pool?	248	
Value of referral; it should be reserved for those that really need it Aware of people that misuse the referral process Values the scheme Other benefits of the scheme Doctor has responsibility to screen for referral Some people may be referred for a bad toe	D: You know what there is people that use it as well though That's where doctor comes into it, the doctors shouldn't be be referring for a bad toe. Shouldn't be referring for bad toe.	249	Value of referral Position of health professional in referral
	K: For real reason	250	
	D: Should be	251	
	K: Session of 12 weeks – is 12 weeks long enough?	252	
Strongly suggests referral should be for longer time Sees own condition as more severe 12 weeks is not long enough Loads of people claiming disability unfairly Takes time to build relationship Frustration that others jump on the bandwagon People fooling the system on one hand and system not meeting needs of those that need it Many people are wrongly put on	D: 12 weeks. No way, no way in the world is it no way so after 12 weeks what do you do then when you are just getting to know the girl or the guy. What's 12 weeks...3 months...no way is it, no way in the world is it long enough no way? Not for someone, lot of different disabilities a lot of	253	Referral time Building relationships Misuse of referral

the sick list and misuse the referral	people getting disability living allowance when they shouldn't be horrendous some of them; loads of them shouldn't be getting it, I know who should not be getting it and they are, down to the doctors who are saying you're sick, saying you've got say sciatica and let's put you on the sick.		
	K: Making it appropriate. If you were to be able to say for somebody like you, how could this scheme the physical activity referral scheme be made better for somebody like you?	254	
Not better? In what way? Wheelchair access would be an improvement Doesn't think referral process could be improved Thought that refurbishment would include wheelchair access Wheelchair access would make it a better space Space is really important to him	D: I don't think you could I don't think it could because. No I don't think they could. I can imagine now it has been refurbished, it's got wheel chair access.	255	Referral process improvement
	K: Yeah That I am not sure. Need to be checked out.	256	
Perception that wheelchair access would be high priority during refurbishment	D: I can imagine it has now	257	
	K: Would be great	258	
	D:I can imagine it has now	259	
	K:Very tight	260	
Without any lead connection of mental and physical health When the conditions (mentally and weather) are right, he would like to be referred to scheme	D: Loads of people there, loads of people. But erm I paid once once I get over my blues,	261	Mental and physical health

Needs to prepare mentally to attend Busy gym Needs to sort head out first before physical referral With time, he may reconnect with referral at my pace Although a physical scheme, mental support may be of value Is anxious and nervous about re-entering the scheme Potential to re-engage	once I am back in the sky I think erm I once the weather? I will be using the gym, I will ask if the doctor will refer me again I think that if that is possible. I don't know if that is possible. But if it is. I haven't had the phone call to say. Thinking of phone them, to tell that I won't be using it got to sort my head out first mean that literally before I go.		Barriers to referral Future intentions to referral scheme Feeling about reengagement
	K: Is it ___ the surgery where you are based	262	
	D: ?	263	
	K: It is _____	264	
Recognises thousands of other people that are disabled Knows there are others like him	D: No _____ Erm loads of people who are disabled, thousands thousands thousands of people	265	Association with others
	K: Is it appropriate to refer people that are disabled to the activity referral scheme somebody with your disabilities	266	
Acknowledges the good intention – though not right for him Although they were trying to help, was not the right thing to refer Good scheme for others or for those that are ready They didn't listen to him	D:No I don't think I should have been referred, trying to help me	267	Perception of referral
	K: Absolutely	268	
	D: The pool there	269	
	K: The pool	270	
Back to the mention of specific activity that would be supportive Swimming is a beneficial activity Health professional perceived pool will help	D: He was thinking only one thing, the pool is there, pool is there pool will help him. That I know for a fact because he told me.	271	Possible physical activity

Pool is a solution			
	K: Sounds like you put that connection together.	272	
Referred for using the pool; was not sure if he could swim Knew that the pool was the reason for referral Thinks it is wrong to refer people with the type of disabilities he has His disabilities are severe and he has specific needs for his condition The health professional and his opinions are not the same	D: Knew for a fact he referred me specifically for that pool. But erm somebody with my disability no I don't think.	273	Inappropriate referral Communication with health professional
	K: Hearing that a referral to a pool would have been just a pool without the gym induction without the gym machine just the pool would had been better.	274	
Unsure of options available Questioning if referral with pool possible Enquiring – possibilities	D: I don't know if there is a referral just with a pool is there?	275	Referral process ambiguity
	K: The activity referral scheme if they have got a pool on the facilities you can use as part of the membership.	276	
Concerned that membership will be cancelled Valued the opportunity	D: That is what I am saying. Think they'll take my membership away.	277	Re-engagement?
	K: Is it the cost that will be a challenge?	278	
Practical financial barrier Cost is a potential barrier Perceived cost of using pool £5.50	D: Ah the cost, course it will yeah. I mean, how much is it to use the pool, £5.50?	279	Financial barrier

	K: Right, Yeah to go to use the pool for that.	280	
	D: Every time I go to use the pool?	281	
	K: What would be an appropriate price to pay to go?	282	
£2.50 an appropriate cost to use swimming pool	D:Use the pool two and a half	283	Appropriate cost
	K: £2.50 kinda affordable	284	
Cost relational to activity	D: £2.50	285	
	K: That would be appropriate once a week to be able to go to the pool.	286	
Keen to re-engage and to ask if the pool is an option for the reduced cost Would be brilliant to have reduced rates for using the pool – intention to make a phone call to ask The cost is a motivating factor When the factors are right, he'd be happy to commit	D: That would be absolutely brilliant. I'm actually, I am going to ring them to see if I can just use the pool. If they say I can, that'll be great as it's £1.50.	287	Re-engagement considerations
	K: Is that what they do on activity referral it's just £1.50.	288	
Expected to pay; paid £10 at induction. Some people think it is for free Perception by others that there is no charge The referral process is worth investing in	D: Give them a £10, give them a tenna when they do all you all ya? and questionnaires and then they say £1.50 and she said to me that the impression once they have been referred that you get it for free. (laughing) What! Anyone who goes there thinking you'd get it for free?	289	Referral cost

	K: Happy to pay for it.	290	
Does not want to pay £5 per swimming session Happy to pay – questions id £5 is the appropriate amount to pay	D: Of course I am happy to pay for it. But a fiver to go swimming?	291	Appropriate investment
	K: It needs to be	292	
Checking if I would pay £5 to go swimming	D: Would you pay a fiver to go swimming?	293	
	K: Think that is expensive. Think £5 is a lot to go for a session.	294	
Hoping they will be able to meet his needs Hopes he is still able to use referral If payment is at right level, engagement is likely	D: That's what they are wanting so I'll I am in hoping hope they?	295	Reengagement
	K: What you are looking for is to go back into the scheme and to just	296	
Even without contact, feels part of the scheme Thinks he is still included in the scheme as no phone call to end referral Instructor said if you don't come you are letting someone miss out Hit me – was not a welcome statement Thinks he is still enrolled on the scheme By not going, he felt he was wasting a valuable space Felt guilty Felt pressure that he was taking someone else's place Impact of saying "you are making somebody miss out"; potential to develop resistance and guilt	D: I am still in the scheme, they haven't phoned me and said its? you are not coming it's a waste of time someone else can have your spot she hit me with that one someone else she did actually, she said if you don't come then you're erm letting somebody miss out	297	Taking up space
	K: right and that was from the leisure provider that said that	298	
	D:mmm young girl whose	299	
	K: What did you think	300	

	when she said that		
Non-committal Responds to statement about letting others down He is in charge of what he will do Resistance and likely disengagement	D: I said well If I come I come if I don't I don't you know what I mean	301	Resistance to referral scheme
	K And at that time you were thinking I ain't coming (Laugh)	302	
Not sure on process – did he ask these questions at induction or was he so anxious that he was not able to process information thoroughly? Request to use pool at the time of referral Would prefer to use pool – not sure if this is an option Hoped that it was ok to just use the pool Choice is important	D:At that time I said to her then I said to her I just want to use the pool, but I can't remember if she said you can just the pool on this referral or you've got to use all, I can't I can't imagine that they'd say you have to use everything.	303	Confusion about referral process Potential to re-engage
	K: Weren't sure.	304	
Busy environment Loads of people queuing to use machines Prefers getting out of the way anyway	D: Loads of people in there, so surely line of people not a line of people that you'd see but a line of people waiting to go and use treadmill before ya? Do you know what I mean	305	Referral experience
	K: If you were to make the phone call, to go back onto the scheme you'd get 12 weeks.	306	
Looking to maintain activity Not sure what the next steps would be – element of confusion Process after 12 weeks – pay amount of money Not sure about what happens after 12 weeks Will require more investment after the referral programme – potential to continue Only not sufficient support – reinvestment required	D: Yeah, and that's another thing they only give you 12 weeks and once the 12 weeks are done I don't know what happens oh yeah I do once you've done 12 weeks you've got to pay £50 I think or £40. Was it £40 or £60 can't remember.	307	Unsure of post-referral steps

	K: So an amount of money.	308	
	D:For 6 months something like that	309	
	K: Pay that monthly or is?	310	
Unclear	D: Can't remember.	311	
	K: Pay amount.	312	
Range of gyms to use within the referral Opportunity to explore	D: Standard payment, that you give them for X amount for whatever, not really erm? like once there is four of them in Northampton.	313	Referral options
	K:Trilogy	314	
	D: Four of them.	315	
	K: Think 3 – Danes Lings and Mounts	316	
3 gyms included in referral process	D: 3 of them of course 3 of them	317	
	K: Could use all facilities in all of them.	318	
Likes idea of variety or sites to choose from Values choice between different locations Positive reflection to use all facilities within referral Options and choices appreciated and welcomed	D: Can use all of them which is a good thing.	319	Positive reflection of referral process
Expressed gratification and depth of what I've heard	K: Just as a, hearing that you are intending to do some kind of physical activity, doctors voice of get in the pool get in the pool get in the pool is there, you can see value doing it to lose the weight, challenges of being in pain, to be brave enough to do that which is quite incredible you know listening to that I just think wow.	320	
Diverts the topic and does not accept compliment	D: Thank you but erm. I can't think like that.	321	Self perception

Acknowledges affirmation – rejects it Unable to accept compliment Does not feel brave at present	What are you studying?		
	K: Doing a PhD in activity behaviours so when people start to become physically active how do we keep then going– trying to understand three processes mentally how are people, are they ready to do physical activity.	322	
Interested to know how people are grouped	D: How are you categorising them?	323	
	K: As individuals so for me it is not about putting boxes on people seeing where they are at. Understanding while people are changing that six months ago you may be thinking very differently to where you are thinking today, and tomorrow you might feeling differently to today. Going with where you are currently thinking. Accepting that thoughts go up and down, one minute up there and feel great then you are down, so the thought will change how someone behaves and then changes how someone behaves changes how your body is, when feel well, may want to go swimming.	324	
	D:Like going for a walk sort of thing	325	
	K:When you go for a walk	326	
Physical activity dependent upon what he felt Mood affected physical activity	D: When you don't feel like it you don't want to do anything.	327	Emotional and physical health

Emotions governed activity			
	K: Yeah	328	
Happy to take self-responsibility Sorting head out is part of the process Mental health needs sorting Discrepancy with how he wanted to be and current lifestyle	D: Exactly right. I mean I've have definitely got to sort my literally to sort my head out.	329	Current mental health needs Self-management of wellness
	K: Sounds like you have a lot self awareness. And there have been huge challenges. That's the bit I can't relate to as I haven't been in a motorbike accident.	330	
Would not like others to experience what has happened to him That he has experienced a severe trauma that would not be wished upon others, not even people he didn't like Even I don't deserve to feel like this	D: I wouldn't wish that on my worst enemy.	331	Reflection of trauma experience
	K Certainly totally respect and I am extremely privileged to hear your story.	332	
There are other examples of this level of trauma	D: Erm have you seem my left foot?	333	
	K: Long long time ago my left foot, remember being very emotional quite sad – heart wrenching film, does that relate to you?	334	
Wants to express that he has admiration for others and is gutted about his own lack of determination – reflects on this often Feels inadequate compared to other people who have disability Feeling of shame Inspired by their story	D: Yeah, actually puts me to shame	335	Self-perception Comparison with others
	K: What is it that inspires you about that	336	

	You said puts you to shame but what is it that inspires you about the film?		
Similar situation – limitation of mobility	D: He couldn't walk and couldn't talk but knew what was happening around him, his dad? His mother	337	
	K: Do remember now	338	
	D: His Mum was ... one day he got a piece of chalk or piece of coal and...	339	
	K: Do you remember now, can see him in the film doing that now.	340	
Emphasis that other disabled people can do it Reflection of how he feels about his situation and that of the true story Wish I could communicate to others	D: Wrote his name well that's that's a true story by the way … that guy puts me to shame	341	Desire to be well
	K: Changes could come about the inspiration could support your journey	342	
Way film is played Reiteration of shame It is possible	D: That guy absolutely puts me to shame. It's the way it is played as well Daniel Day Lewis.	343	Hope
	K: Remember the frustration actually that he experienced in making the changes	344	
Admiration	D: Brilliant, gets his own?	345	
	K: Gets carted around in a trolley	346	
	D: In a trolley that's right.	347	

	K: The perception	348	
There is a need to escape at times	D:He's got a bottle of whiskey in his erm inside pocket with a straw	349	
	K: I remember	350	
	D: ?	351	
	K:Lady there	352	
Felt awkward – not sure what to do if offered loan of DVD Appreciation that there are other people with more serious disabilities Discrepancy to be explored Life could be ok Hope	D: He fell in love with her fell in love with her and got married. Brilliant. I've got it there But erm? worse people out there.	353	
	K: Sounds like you are in quite a pivotal stage, stage of taking control.	354	
Able to identify that others are worse – though at that moment, he felt sad for the situation Need to start – nothing stopping him Awareness of where he is now – nothing stopping him – needs to start It's what other people think that is stopping him – need to let that go Internal conflict and comparison with others create a sense of guilt and shame Opening up to look at options	D: people worse than me I am more erm self conscious? nothing stopping me and erm I need to start? what people say	355	Comparison with others Change talk - Awareness of barriers
	K:Going to the pool	356	
Going home – challenging Unable to express how he feels with family Home environment Communicating with family members was challenging Was never listened to in the family and more so now; feels that family is unable to listen to his needs Home is not a place where he fit in now	D: When I go home? honest. Cause the area that I came from is very rough and ready people around I come from a family of 12 I am the youngest of 12? what are you talking about you are not getting in the wheelchair. Could not get that across to	357	Lack of social support from family Communicating needs

	them, not in their make up		
	K: Your lived experience	358	
Ashamed and unable to communicate what is being experienced Not associated with family – own journey – sense of isolation Unable to express himself to family Effort to communicate – they don't understand Loneliness; unable to share the experience	D: Just couldn't get that across to them not in their make up (Audio stops end of one hour)	359	Isolation
	K: Sort of beeps at me to let me know	360	
Just wants to be listened to – accepts that it can't be taken away Reiteration of not being understood Unable to articulate needs	D: But erm Just couldn't understand what I was trying to tell them.	361	Not understood
	K: The experience you have had, sounds like if someone could understand	362	
What he would like them to understand Strong desire to be heard and for others to understand him Looking for relatedness Want relationships to improve	D: If they could understand, what it feels like being in pain when you walk I mean, you know what I mean	363	Communication and social needs
	K: Any last words in terms of physical activity referral scheme, what would you say I am tempted to say improve but it's not even improve but it doesn't sound like it even started. You got the referral and you went, you did the hard work you got to the gym yourself, what would make it a better	364	

	experience?		
Referral could be improved by having less people in the gym space	D:Less people	365	Improvement of referral process
	K: Less people right environment less people	366	
Referral could be improved with more space Breathing space – to allow for anxiety	D: Less people and maybe bigger gym	367	Improvement of referral process
Wants the personal experience where he feels comfortable – where he can be understood	K: Making the environment right for you	368	
Machines with English instructions would make the referral a better experience Being understood and understanding is important in feeling comfortable in the environment Referral could be improved with English instructions on machines	D: and er English working machines	369	Improvement of referral process
	K:Right machines, right space	370	
	D: Yeah? That was just a joke	371	
	K: I get you. If you're trying read it and you can't read it	372	
Importance of mentally being in the right place People with disabilities need mental support before the physical referral Doctor should not refer until mental health understood – link to disability Physical disability comes along with mental challenges that need	D: They were erm, they were great it's just me and disabilities, the last word, people with er people with disabilities shouldn't be referred until the doctor knows where there head is at.	373	Mental health and disability Positive reflection of referral process

to be addressed Referral process appreciation – acceptance that the internal world had created barriers Mental health priority over physical health			
	K: Making sure mental approach right	374	
Takes immense effort to take first step No connection with others in gym environment and so needed to get mentally prepared to take the first step through the door Daunting for people to go into the gym environment Comparison with self and others when in the gym environment Piggy in the middle ... struck me as an interesting comment to make Comparisons are naturally made when in the gym environment with others who are fitter; this is an uncomfortable experience. It takes guts to even step in the door Unfamiliar territory	D: Mentally right for that environment. Making sure that they are mentally right literally. Making sure they are mentally right because it's very daunting for people to go into a gym when you have king Kong over here and Martine Natinova over here. And you haven't done no exercise for years, you're feeling like piggy in the middle.	375	Referral considerations Comparison to others
	K: So clear the message you have given, thank you for giving me your time	376	
Happy to have shared the experience	D:Pleasure	377	
	K: Anything else you want to say about the scheme itself or physical activity.	378	
	D: No	379	
Emphasis on ethics and protection of information	K: Happy in that space. Just to make it really clear in terms of confidentiality of what you have mentioned in the last hour. It will be transcribed so it will be typed up and what I'd	380	

	like to do is to give you a copy of it so I can check that it is right, erm and from there from what I draw out themes I have interviewed 10 people and you are the last out of the 10 to see what the common themes have been and that then gets put into a report, but right the way though the report you will never be identified so people won't know what you have said it's just a general report. The information then gets held at School of Health in the University and nobody has access to that so it it kept totally secure, after 7 years totally destroyed.		
Wants to share experience to aid understanding Would like the information from the experience to be shared to help others Desire to help others Kind heart	D:If what I have said can help anybody to be honest with you. If what I have said can help anybody?	381	Desire to support others
	K:Thank you. (both laughing) Pausing audio at this stage. 63.39	382	

Member check feedback – 12–1 pm, Tuesday 24th January 2012

Dav: Age, 42 years; wheelchair, 11 years, Attendance, 1; White British Male

True account – "Most definitely"

Reasonable analysis

- I thought it was spot on? They were spot on. There weren't a bit where you got it wrong, not a bit of it.
- You've done well there are not a lot of people that can understand me
- Your own words written very well
- You got me down to a tee – think it is brilliant
- Where you say I am ashamed – you got that to a tee
- You got that over well too – about S in pain.
- Way family don't understand me - that is spot on.
- Compared to disabilities – spot on
- Screaming to get out - You got me good and proper – you got my heart

Impact of research interview

- Since you have left erm, as soon as you left my very first thought was I have got to sort my head out. I have become very aware, also unfair on J.
- I cried when I read this – brought a tear to my eye. Just the state that I have got myself in the state coz I am not doing nothing. It's very hard. When I read this – it brought a tear to my eye.
- Seeing it in black and white – Wow!
- What I'd like to do next – what I am going to do next – get my life back. Start taking my girl out again.
- Weight because I don't want to get on a scooter – the first thing would be the weight issue because it's causing problems that I didn't have before.
- Gonna buy a bike cause I am not ready to go to the gym.
- It'll get me fitter – by being fitter it'll make everything....
- Glad I met you because it brought home alot of things I'm not doing
- I am going to start doing things with her
- It has really erm it has really brought home a few things
- Doing it has reminded me that I am not a flake

Appendix D.1 - GPPAQ

General Practice Physical Activity Questionnaire

1. Please tell us the type and amount of physical activity involved in your work. Please tick one box that is closest to your present work from the following five possibilities:

		Please mark one box only
A	I am not in employment (e.g. retired, retired for health reasons, unemployed, full-time carer etc.)	
B	I spend most of my time at work sitting (such as in an office)	
C	I spend most of my time at work standing or walking. However, my work does not require much intense physical effort (e.g. shop assistant, hairdresser, security guard, childminder, etc.)	
D	My work involves definite physical effort including handling of heavy objects and use of tools (e.g. plumber, electrician, carpenter, cleaner, hospital nurse, gardener, postal delivery workers etc.)	
E	My work involves vigorous physical activity including handling of very heavy objects (e.g., scaffolder, construction worker, refuse collector, etc.)	

2. During the *last week*, how many hours did you spend on each of the following activities? Please answer whether you are in employment or not.

Please mark one box only on each row

		None	**Some but less than 1 hour**	**1 hour but less than 3 hours**	**3 hours or more**
A	Physical exercise such as swimming, jogging, aerobics, football, tennis, gym workout etc.				
B	Cycling, including cycling to work and during leisure time				
C	Walking, including walking to work, shopping, for pleasure etc.				
D	Housework/Childcare				
E	Gardening/DIY				

3. How would you describe your usual walking pace? Please mark one box only.

Slow pace (i.e. less than 3 mph)		Steady average pace	
Brisk pace		Fast pace (i.e. over 4mph)	

Hit "Return" to calculate PAI

Appendix E.1 - LGM Study Questionnaire

The CARE Measure

1.Please rate the following statements about today's consultation. Please tick one box for each statement and answer every statement.

How was the provider at ...	Poor	Fair	Good	Very Good	Excellent	Does Not Apply
1. Making you feel at ease…… *(being friendly and warm towards you, treating you with respect; not cold or abrupt)*	□	□	□	□	□	□
2. Letting you tell your " story"…… *(giving you time to fully describe your illness in your own words; not interrupting or diverting you)*	□	□	□	□	□	□
3. Really listening …… *(paying close attention to what you were sayings; not looking at the notes or computer as you were talking)*	□	□	□	□	□	□
4. Being interested in you as a whole person … *(asking/knowing relevant details about your life, your situation; not treating you as "just a number")*	□	□	□	□	□	□
5. Fully understanding your concerns…… *(communicating that he/she had accurately understood your concerns; not overlooking or dismissing anything)*	□	□	□	□	□	□
6. Showing care and compassion…. *(seeming genuinely concerned, connecting with you on a human level; not being indifferent or "detached")*	□	□	□	□	□	□
7 . Being Positive…… *(having a positive approach and a positive attitude; being honest but not negative about your problems)*	□	□	□	□	□	□
8. Explaining things clearly…….. *(fully answering your questions, explaining clearly, giving you adequate information; not being vague*	□	□	□	□	□	□
9. Helping you to take control…… *(exploring with you what you can do to improve your health yourself; encouraging rather than "lecturing" you)*	□	□	□	□	□	□
10. Making a plan of action with you … *(discussing the options, involving you in decisions as much as you want to be involved; not ignoring your views)*	□	□	□	□	□	□

Comments:

PHQ-9 Adapted from _____ Health Care Centre

PHQ-9	Over the **last two weeks** (or other agreed time period) how often have you been bothered by any of the following problems?	Not at all	Several days	More than half the days	Nearly every day
1.	Little interest or pleasure in doing things	0	1	2	3
2.	Feeling down, depressed, or hopeless	0	1	2	3
3.	Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4.	Feeling tired or having little energy	0	1	2	3
5.	Poor appetite or overeating	0	1	2	3
6.	Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7.	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8.	Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9.	Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3
	PHQ-9 total score =				

Please circle the appropriate answer.

1. What is the level of moderate physical activity per week recommended by the Chief Medical Officer? (Moderate physical effort so that you breathe somewhat harder than normal)

5 × 30 min

5 × 60 min

3 × 30 min

7 × 120 min

Don’t know

2. I can manage my time to be able to do physical activity

Strongly disagree Strongly agree

0 1 2 3 4

3. Physical activity makes me feel good

Strongly disagree Strongly agree

0 1 2 3 4

4. Physical activity is...

Bad for me Good for me

0 1 2 3 4

5. When my life is busy, I am confident in my own ability to exercise

Strongly disagree				Strongly agree
0	1	2	3	4

6. Physical Activity includes activities such as brisk walking, jogging, cycling, swimming, or any other activity such as gardening, in which the exertion makes you feel warmer or slightly out of breath. Which statement best describes you?

I am not physically active and do not intend to perform physical activity in the next six months

I am not currently physically active but intend to become more physically active in the next six months

I am currently physically active but not regularly

I have been engaging in regular physical activity for less than six months

I have been regularly physically active for the past six months

1. In the last week, on how many days have you accumulated at least 30 minutes of moderate-intensity physical activity, such as brisk walking, cycling, sport, exercise, and active recreation? Do not include physical activity that may be part of your job or usual role activities.

Enter no of days

2. How much time in total do you estimate you spent participating in moderate-intensity physical activity last week?

Enter no. of minutes

How important is it for you to do physical activity? (0 to 10)

Not important Very important

0 1 2 3 4 5 6 7 8 9 10

How confident are you that you can change your behaviour to be more physically active? (0 to 10)

Not confident Very confident

0 1 2 3 4 5 6 7 8 9 10

Health Survey (SF36)

This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

Please answer these questions by "check-marking" your choice. Please select only one choice for each item.

1- In general, would you say your health is:

□ 1. Excellent □ 2. Very good □ 3. Good □ 4. Fair □ 5. Poor

2- Compared to ONE YEAR AGO, how would you rate your health in general NOW?

□ 1. MUCH BETTER than one year ago.

□ 2. Somewhat BETTER now than one year ago.

□ 3. About the SAME as one year ago.

□ 4. Somewhat WORSE now than one year ago.

□ 5. MUCH WORSE now than one year ago.

3- The following items are related to activities you might do during a typical day. **Does your health now limit you** in these activities? If so, how much?

Activities	**1. Yes, Limited A Lot**	**2. Yes, Limited A Little**	**3. No, Not Limited At All**
a) **Vigorous activities,** such as running, lifting heavy objects, participating in strenuous sports.	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all
b) **Moderate activities,** such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all
c) Lifting or carrying groceries.	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all
d) Climbing **several flights** of stairs.	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all
e) Climbing **one** flight of stairs.	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all

f) Bending, kneeling, or stooping.	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all
g) Walking **more than a mile.**	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all
h) Walking **several** blocks.	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all
i) Walking **one** block.	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all
j) Bathing or dressing yourself.	□ 1. Yes, limited a lot	□ 2. Yes, limited a little	□ 3. No, not limited at all

4. During the **last four weeks**, have you had any of the following problems with your work or other regular activities as a result of your physical health?

	Yes	No
a) Cut down on the **amount of time** you spent on work or other activities.	□ 1. Yes	□ 2. No
b) **Accomplished less** than you would like.	□ 1. Yes	□ 2. No
c) Were limited in the **kind** of work or other activities.	□ 1. Yes	□ 2. No
d) Had **difficulty** performing the work or other activities (e.g. it took extra effort).	□ 1. Yes	□ 2. No

5. During the **last four weeks**, have you had any of the following problems with your work or other regular daily activities **because of any emotional problems** (such as feeling depressed or anxious)?

	Yes	No
a) Cut down on the **amount of time** you spent on work or other activities.	□ 1. Yes	□ 2. No
b) **Accomplished less** than you would like.	□ 1. Yes	□ 2. No
c) Did not do work or other activities as **carefully** as usual.	□ 1. Yes	□ 2. No

6. During the **last four weeks**, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?
□ 1. Not at all □ 2. Slightly □ 3. Moderately □ 4. Quite a bit □ 5. Extremely

7. How much **<u>bodily</u> pain** have you had during the **past four weeks**?

□ 1. None □ 2. Very mild □ 3. Mild □ 4.Moderate

□ 5. Severe □ 6. Very severe

8. During the **last four weeks**, how much did **pain** interfere with your normal work (including both work outside the home and housework)?

□ 1. Not at all □ 2. A little bit □ 3. Moderately □ 4. Quite a bit □ 5. Extremely

9. These questions are about how you feel and how things have been with you **during the last 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the **last 4 week** …

	1. All of the time	2. Most of the time	3. A good bit of the time	4. Some of the time	5. A little of the time	6. None of the time
a) Did you feel full of pep?	□ 1. All of the time	□ 2. Most of the time	□ 3. A good bit of the time	□ 4. Some of the time	□ 5. A little of the time	□ 6. None of the time
b) Have you been a very nervous person?	□ 1. All of the time	□ 2. Most of the time	□ 3. A good bit of the time	□ 4. Some of the time	□ 5. A little of the time	□ 6. None of the time
c) Have you felt so down in the dumps that nothing could cheer you up?	□ 1. All of the time	□ 2. Most of the time	□ 3. A good bit of the time	□ 4. Some of the time	□ 5. A little of the time	□ 6. None of the time
d) Have you felt calm and peaceful?	□ 1. All of the time	□ 2. Most of the time	□ 3. A good bit of the time	□ 4. Some of the time	□ 5. A little of the time	□ 6. None of the time
e) Did you have a lot of energy?	□ 1. All of the time	□ 2. Most of the time	□ 3. A good bit of the time	□ 4. Some of the time	□ 5. A little of the time	□ 6. None of the time
f) Have you felt downhearted and blue?	□ 1. All of the time	□ 2. Most of the time	□ 3. A good bit of the time	□ 4. Some of the time	□ 5. A little of the time	□ 6. None of the time
g) Do you feel worn out?	□ 1. All of the time	□ 2. Most of the time	□ 3. A good bit of the time	□ 4. Some of the time	□ 5. A little of the time	□ 6. None of the time
h) Have you been a happy person?	□ 1. All of the time	□ 2. Most of the time	□ 3. A good bit of the time	□ 4. Some of the time	□ 5. A little of the time	□ 6. None of the time
i) Did you feel tired?	□ 1. All of the time	□ 2. Most of the time	□ 3. A good bit of the time	□ 4. Some of the time	□ 5. A little of the time	□ 6. None of the time

10. During the **past four weeks**, how much of the time have your **physical health or emotional problems** interfered with your social activities (like visiting friends, relatives, etc.)?

□ 1. All of the time

□ 2. Most of the time

□ 3. Some of the time

□ 4. A little of the time

□ 5. None of the time

11. How TRUE or FALSE is **each** of the following statements for you?

	1. Definitely true	2. Mostly true	3. Don't know	4. Mostly false	5. Definitely false
a) I seem to get sick a little easier than other people.	□ 1. Definitely true	□ 2. Mostly true	□ 3. Don't know	□ 4. Mostly false	□ 5. Definitely false
b) I am as healthy as anybody I know.	□ 1. Definitely true	□ 2. Mostly true	□ 3. Don't know	□ 4. Mostly false	□ 5. Definitely false
c) I expect my health to get worse.	□ 1. Definitely true	□ 2. Mostly true	□ 3. Don't know	□ 4. Mostly false	□ 5. Definitely false
d) My health is excellent.	□ 1. Definitely true	□ 2. Mostly true	□ 3. Don't know	□ 4. Mostly false	□ 5. Definitely false

End of questionnaire - Thank you for your time ☺

Appendix E.2 - MITI Coding Template

Motivational Interviewing Treatment Integrity (MITI) Code

Audio: Coder: Date:

Global Ratings

Evocation		1 Low	2	3	4	5 High
Collaboration		1 Low	2	3	4	5 High
Autonomy/Support		1 Low	2	3	4	5 High
Direction		1 Low	2	3	4	5 High
Empathy		1 Low	2	3	4	5 High

Behaviour Counts

Giving Information			
MI Adherent	Ask permission Affirm Emphasis on Control Support		
MI Non Adherent	Advise Confront Direct		
Question	Open		
	Closed		
Reflection	Simple		

	Complex		
	TOTAL Reflections		

First Sentence:

Last sentence:

List of MITI Codes

EVOCATION	(Global rating of evocation)
COLLABORATION	(Global rating of collaboration)
AUTONOMY/SUPPORT	(Global rating of Autonomy/Support)
DIRECTION	(Global rating of direction)
EMPATHY	(Global rating of empathy)
SPIRIT	(Global rating of MI Spirit; Average of Evocation, Collaboration, Autonomy/Support)
GI	(Giving Information)
MiA	(MI Adherent)
MiNa	(MI Non-adherent)
OQ	(Open Question)
CQ	(Closed Question)
Rs	(Reflection simple)
Rc	(Reflection complex)

- Global Spirit Rating = (Evocation + Collaboration + Autonomy/Support) / 3
- Percent Complex Reflections (% CR)
  = Rc / Total reflections
- Percent Open Questions (% OC)
  = OQ / (OQ + CQ)
- Reflection-to-Question Ratio (R:Q)
  = Total reflections/(CQ + OQ)
- Percent MI Adherent (% MiA)
  = MiA / (MiA + MiNa)

Appendix F.1 – QMiP Journal Article

Clarke, K. & Walker, N. 2013. Getting off the starting blocks: An interpretative phenomenological analysis (IPA) of a physical activity referral scheme (PARS) non-completer. *QMiP Bulletin* (15) 6-14.

Peer-reviewed article

Getting off the starting blocks: An interpretative phenomenological analysis (IPA) of a physical activity referral scheme (PARS) non-completer

Kerry Clarke & Natalie Walker

This paper is an example of the outcomes from an IPA analysis of a physical activity referral scheme (PARS) non-completer. It demonstrates the value of conducting qualitative research to better understand who a non-completer is, how to support them to become physically active thus improving the PARS experience by listening to the expert; the patient.

PHYSICAL INACTIVITY is one of the four key risk factors to health responsible for the growing epidemic of non-communicable diseases (NCDs) (World Health Organisation, 2011). A recent estimation suggests 23.4 million deaths were due to NCDs (Alwan et al., 2010). The leading global risks for mortality in the world are high blood pressure (13 per cent of global deaths); tobacco use (9 per cent); high blood glucose (6 per cent); physical inactivity (6 per cent); and being overweight/obesity (5 per cent) (WHO, 2009). Although inactivity is the fourth factor it may influence the other factors. Physical inactivity is reported to cost the UK National Health Service (NHS) £1.06 billion per year directly (Allender et al., 2007), with indirect costs due to sickness increasing this figure to £8.2 billion annually (Department of Health, 2004; NICE, 2006a). Furthermore, the annual economic cost due to sickness and worklessness is estimated to be over £100 billion (Black, 2008).

With evidence connecting physical activity (PA) and health (physical and mental) benefits (Morris & Crawford, 1958; Lahti-Koski et al., 2002; Samad et al., 2005) and supporting guidance from the Government (Department of Health, 2004; 2005; 2009) it could be expected that the population would positively embrace being physically active in order to enhance quality of life. Hence Governmental support of PA behaviour change interventions in order to reduce NHS costs of reacting to NCDs. However, this is not the case, due to either real or perceived barriers (i.e. time and money). Only 40 per cent of surveyed males and 28 per cent of females met the Chief Medical Officer's recommended PA level in 2006 (The Information Centre, 2006).

The Olympic Legacy Action Plan (LAP) included a target of two million more active people in the UK (Department for Culture, Media & Sport, 2009) in time for the 2012 Olympics. Physical Activity Referral Schemes (PARS) are one of the four given methods to promote PA within primary care to sedentary individuals (NICE, 2006b). In the scheme a patient is referred by a health professional to a leisure provider for 35 sessions of PA in the gym, including an induction and exit appointment. The National Institute of Clinical Excellence (NICE, 2006b) stated that PA levels in the long term (post three months) along with evaluation of knowledge, skills and attitudes, should be explored to assess effectiveness of PARS. Even though the impact on long-term behaviour change is as

yet unknown, the number of PARS across the UK has rapidly grown (Fox et al., 1997).

In order to better understand the effectiveness of PARS, there have been a number of PARS systematic reviews (Riddoch et al., 1998; Gidlow et al., 2005; Morgan, 2005; NICE, 2006c, 2006d; Williams et al., 2007). Morgan (2005) concluded that PARS do increase PA levels for those who are slightly active/not sedentary. However, it has been estimated that 80 per cent of referrals may drop out of the programme before completion (Gidlow et al., 2005).

PARS are normally assessed quantitatively, yet a qualitative study would add rich detailed data of personal experiences that may be missed by other methods. The individual experiencing an intervention such as activity on referral is best positioned to explain their lived experiences (e.g. why they did or did not attend). Open questions allow efficient elicitation of how to improve schemes for PA behaviour change. The first systematic review to include a qualitative study (Williams et al., 2007) intended to collate reasons for non-adherence, as the review concluded that 17 sedentary people would need to be referred for one to become physically active. The qualitative study (Wormald & Ingle, 2004) used focus groups and content analysis. The report suggests that the exercise referral schemes were seen by most to be a positive experience; however only 23 per cent were non-completers and the recommendations included recruiting more non-completers in future studies. Williams et al. (2007) highly criticised PARS qualitative studies (Lord & Green, 1995; Taylor et al., 1998; Martin & Woolf-May, 1999) as being superficial, lacking depth in analysis and not addressing what changes could be made to improve the experience. However, the methods used in some qualitative studies (such as content analysis) may be more the issue than the epistemological approach. Transparency and rigour are considered by Yardley (2000) as guiding principles to produce quality qualitative research, and due to lack of detail about methods used and/or audit trail, qualitative studies are excluded from PARS meta-analysis. In the latest PARS systematic review, there were no qualitative studies included (Taylor et al., 2011).

It is not known why the drop-out rate for PARS is high. For effective use of financial resources the assessment of patient experience is part of the intervention design (Department for Health, 2001). Hence, a robust study was designed to better understand the lived experience of non-completers and specifically those that attended less than four (10 per cent) of the 35 sessions available at the leisure centre. IPA was selected as the qualitative method to analyse the data due to the focus on lived participant experience and the opportunity to apply a transparent, systematic analytical approach. IPA has three core theoretical perspectives: phenomenology (philosophical approach to the study of experience), hermeneutics (theory of interpretation) and idiography (concerned with the particular) (Smith, Flowers & Larkin, 2009). The thorough auditable process of data analysis enables trustworthiness and meaningful outcomes to be established. Reflexivity is important to consider when using IPA methods due to the double hermeneutic (Smith et al., 2009) required to understand the understanding of a lived experience; the researcher intends to make sense of the participant making sense of their world (Shaw, 2010).

Method

A study of a PARS, known as Activity On Referral (AOR), in Northamptonshire was completed from October 2009 to October 2010. Just 28 per cent (N=626) of participants completed the exit interview (N=2228) and the mean number of sessions attended was 11.62±11.86. This study explores a case study experience of one of the non-attendee referral participants, using IPA.

Participant

Dav (pseudonym) is a typical referral participant for AOR. He is an inactive 42-year-old white British male. Specific to his extreme physical pain following a motorbike accident 11 years ago, he has use of a wheelchair to support his mobility. Dav attended the leisure centre on one occasion.

Design

NHS ethical approval was granted by Leicestershire, Northamptonshire and Rutland research ethics committee. The semi-structured interview schedule was written with the support of a service users' group and remained flexible to enable the participant to add detail where appropriate during the interview. The structure was based on the participant's view of PA, PARS and their future PA intentions.

Procedure

A random sample of 50 participants that had referral paperwork sent to a leisure centre from a health professional, and had not completed the PARS, were contacted via a participant information letter and invited to be part of the research. Dav was the first participant to agree to complete member checking. A 63-minute interview was conducted in Dav's home and was recorded following signed consent. The interview was transcribed verbatim and a reflective journal was used by the researcher throughout the process to engage in reflexivity. The case was externally audit checked by a supervisor for trustworthiness to ensure there was a level of agreement between two researchers. It was also shared with the participant to ensure it was a true account of the interview and a reasonable case of interpretation (Smith et al., 2009). Member checking confirmed the transcript was a true account of the interview and maintains the integrity that the participant is the expert, ensuring the individual experience is maintained subsequent to the analysis by the researcher. The participant selected his preferred pseudonym.

Analysis

An IPA was conducted by re-reading the transcript to hear the participant's voice. The transcript was systematically analysed for description (what is he describing?), deconstruction (reading sentences backwards) and interpretation (what does he mean?). Emerging themes were recorded and were elicited from the analysis data and then organised into super-ordinate themes (Smith et al., 2009).

This paper presents the analysis from one case participant of the non-completing PARS participants. It aims to highlight the value of qualitative research in understanding how to improve PARS and thus meet Government targets.

Results

The major thematic findings concerned who Dav is physically, mentally and socially, his experience of the PARS process and his self-identified barriers to PA. When asked if the analysis was reasonable, Dav's comments confirmed that it was accurate. He stated, *'I thought it was spot on? They were spot on. There weren't a bit where you got it wrong, not a bit of it.'* Furthermore, he noted, *'You got me down to a tee, think it is brilliant'* and *'Screaming to get out. You got me good and proper, you got my heart.'*

Physical, mental and social self-perception

The participant shared thoughts about himself in terms of mental, physical and social health. He valued expressing his current quality of life and related this to the impact of PA and his PARS experience. When expressing his mental health, Dav was able to articulate the depth of his despair. He had become more and more sedentary due to pain following a motorbike accident, which had an impact on his mental health. Prior to the incident he was active and physically fit.

> *'I am very very down at the moment. Probably the lowest I have ever been. And erm not that I am gonna cry or kill myself at the moment, would never do anything like that.'*

He is unable to picture the future and is disappointed in himself for feeling that way.

> *'I have not got any plans. I sound like a sad sack don't I. But erm. In my head I have not got any plans. In my head I have not got no plans. (Yeah) I am sitting off like an idiot. I am not doing nothing for myself.'*

The connection of pain and mental health were negatively associated, potentially having an impact on doing PA. There were physical signs of distress and discomfort during the interview. The pain makes Dav recoil from his otherwise outgoing personality and he currently has no control over the pain experienced.

> *'Pain gets you down. I can be horrible when I am in real bad pain, horrible to her pain puts you in a horrible mood, when you wake up and one foot on the floor and you just go arghh.'*

His current living experience was traumatic and the way that the gym made Dav feel added to high anxiety and potentially decreased his already low self-efficacy.

> *'I couldn't go out in the wheelchair, when I did go out in the wheelchair I was sweating like. It's all erm, I am in for a hard time but, that gym just wasn't right for me.'*

Physically Dav explains the depth of pain experienced and the consequence of not being able to do general tasks. The physical pain is mentally frustrating and impedes high quality of life.

> *'I was, I was washing the dishes what five days ago, turned my head, honest had to stop. Had to stop, went arghh. Yeah, pain is a pain. The pain is erm horrendous.'*

Socially, Dav was uncomfortable to know that people look at him and this created a sense of isolation and inability to communicate to others, including family relations.

> *'I am very conscious about people looking at me anyway just when I am out in the street in the wheelchair. Should know better than that… I was raised better than that. Not to care what people think. But erm.*'

The frustrations were amplified in tone and volume of voice when talking about the misunderstanding with his family, not being able to relate and communicate how he feels, which induced a sense of isolation.

> *'But erm just couldn't understand what I was trying to tell them. Could not get that across to them, not in their make-up… erm haven't been home. Have been home once for my Mum's funeral. But haven't been home since because I'm in that chair.'*

There was a sense of shame in needing to use his wheelchair and a disparity of past identity. Although the wheelchair is not required all of the time, for longer distances and when the pain is severe it is an aid to support him to be mobile. However, he rejects the use of the wheelchair and does not want to be associated with it.

> *'I was a very active lad. I was really active. Being in a wheelchair nah just not me. It's just not me at all'.*

Dav's quality of life was severely affected by his lack of mobility and simple tasks were extremely challenging. He is aware of his potentially unattractive sweating and how others may perceive him. Consequently, it is safer to stay at home isolated rather than being ridiculed. He does not want others to see the trauma he experiences on a daily basis.

> *'As you might tell from the sweating. Erm. But when I erm, just put washing out (yep) on the line. And it's just really hurt me. Erm so no no when I go out. When I go out I go out in the wheelchair. I couldn't walk from here to the shops down the road there… You just feel, just want to wake up honestly there have been days where I have woke up and just thought just want to put quilt over my head.'*

The findings above demonstrate the severity of discomfort experienced for Dav, the mental battle that he experiences and the social challenges that are encountered. These factors combined represent the person (patient) that is being referred to a PARS and provide an insight into the individual needs that require support when becoming more physically active, especially when entering unfamiliar environments.

Referral process

Dav identified three salient elements of the referral process; the medical referral, the leisure centre induction, and his personal thoughts about his PARS experience. Initiated with an inappropriate referral made with missing medical information and instant non verbal resistance given by the patient; on reflection it was not seen to be the right time to be referred to PARS.

> *'Doctor didn't put everything in the referral. And erm he said, he said I can refer you to the gym. I sort of looked at him I looked at him and thought gym what the hell are you talking about? It was at the wrong time.'*

Dav is able to articulate what would improve the scheme from the initiation point of referral from the health professional. Emphasis is expressed on the need for the referrer to be aware of the mental state of the individual prior to making the referral. Though he acknowledges that this perception can change and when the timing is right, when an individual is ready to engage, a referral may be appropriate.

> *'Making sure that they are mentally right literally, making sure that they are mentally right because it's very daunting for people to go into a gym when you have King Kong over here and Martina Navratilova over here. And you haven't done exercise for years, you feel like piggy in the middle.'*

The induction experience was problematic and as a consequence he attended the gym only on this occasion.

> *'Erm. I went there and urhm they, I went there they erm the guy who was supposed to be doing it was not there so a young girl probably about (phwww) bout 28, 30 came erm took me through all the questions me weight, took me weight, me height erm all them all them kind a questions. Then she took me to the gym but erm it was a bit I was a bit put off by the gym, it was very little, there was loads of people in there. She was like trying, she tried to tell me how to use a bike, (yep) but people kept bumping past her and erm you know.'*

The gym environment was not appropriate for Dav. He offers a potentially simple solution to enhance the PARS induction experience to engage a sedentary individual into the leisure centre and potential PA behaviour change.

> *'Yeah, but erm, I would you know what, I would have rather no one been there. Well not no one been there, I know they have got to make money and they've got to be, but erm make it… book a time when the gym wasn't so, there must be a time when people are at work. You know.'*

The induction was a traumatic experience in itself on top of the pain, discomfort and mental challenges of attending the appointment.

> *'I was very conscious. I actually I actually was very conscious and I wasn't to be honest I wasn't really listening to the young girl. Because (arghh) I was just looking around me.'*

Barriers to PA

Barriers and attitudes to PA, current levels of PA, and future intentions were shared during the interview. The key barriers were mental preparation, weather, cost and access to the facilities. Even though he experienced challenges, Dav spoke about re-engaging and once the timing is right, to have another go; indicating a desire to be more physically active.

> *'Loads of people there, loads of people. But erm I paid once once I get over my blues, once I am back in the sky I think erm I once the weather? I will be using the gym. I will ask if the doctor will refer me again I think that if that is possible. I don't know if that is possible. But if it is. I haven't had the phone call to say. Thinking of phone them, that I won't be using it got to sort my head out first mean that literally before I go.'*

The price of the session would be a significant factor in him engaging in the scheme.

> *'Ah the cost, course it will yeah. I mean, how much is it to use the pool, £5.50?'*

As well as practical assess if he were to use his wheelchair to attend the session.

> *'Mmm and funny enough, if I would been in the chair and my partner said this, if I would have been she said to me Dav if you would have been in the chair then you would have been*

snookered. (Yeah) Cause there was just no way in the world that I was getting in.'

Dav thought PA would be of benefit to him to help weight reduction that caused back pain, and future intentions included doing appropriate PA at the right pace for him.

'The weights are an absolute no no for me, erm to do weights absolute no no. As I said about two weeks ago at physio, I didn't know that exercise bike didn't take your full weight that it doesn't stop me from feeling pain. Exercising and er pain can be a killer you know. I do need to shift some weight, for my back's sake. Cause I mean if my back goes that is me buggered, that's me absolutely snookered. I got on the bike and didn't hurt because I wasn't putting my whole weight on my leg. Pain shot right across my back. Paranoid with it. Yeah yeah, the physio nearly killed me. She was only about big. (laughing) She absolutely killed me. Could hardly walk. I was like argh God. Thinking of phone them, that I won't be using it got to sort my head out first mean that literally before I go.'

Member check

Dav was given a copy of the transcript including analysis with the reflective journal and the list of emerging themes. The member checking was conducted face to face in Dav's home at his request. A week later the researcher returned to Dav's home to collect his thoughts on the data/analysis. Dav stated that he had thought about the interview and this had reminded him of what he had forgotten.

'Since you have left erm, as soon as you left my very first thought was I have got to sort my head out. I have become very aware, also unfair on J [Dav's partner].'

On reading the transcript he was emotional and this interaction with his own words reflected what he felt inside.

'I cried when I read this – brought a tear to my eye. Just the state that I have got myself in… the state coz I am not doing nothing. It's very hard. When I read this – it brought a tear to my eye. Seeing it in black and white – Wow!'

When asking what his future intentions were, he was able to articulate that he wanted to make changes and that being physically active was in his plan.

'What I'd like to do next – what I am going to do next – get my life back. Start taking my girl out again.' He stated his priority was, *'Weight because I don't want to get on a scooter – the first thing would be the weight issue because it's causing problems that I didn't have before.'*

Commitment language was heard when he spoke about what his next steps would be. He now seemed to be able to see a future and felt a sense of volition to get going again.

'Gonna buy a bike cause I am not ready to go to the gym' and *'I am going to start doing things with her.'*

Although the interview process unearthed emotional feelings and was uncomfortable at times, it had a positive impact on Dav as he contributed not only to understanding himself better, but also to sharing his lived experience to improve future PARS.

'Glad I met you because it brought home a lot of things I'm not doing… Doing it has reminded me that I am not a flake.'

Discussion

The aim of this study was to explore the lived experience of an AOR participant who did not complete the scheme. Dav detailed the key elements needed to improve PARS experience in order to engage sedentary individuals. His lived experience highlights that interventions need to be individually specific and the referring professional is encouraged to listen to the patient during the consultation (i.e. concern about being in pain and sweating). A communication style such as Motivational Interviewing (MI) (Rollnick et al., 2008; Miller & Rose, 2009) would enable a conversation where the health professional elicits from the patient what action is appropriate for them. Health and fitness professionals are encouraged to elicit barriers that the individual has to becoming more active, and specific to AOR/PARS, the barriers to attending a leisure facility. This is fundamental to the patient experience of PARS (Department for Health, 2001). Once heard, the patient could be involved in problem

solving to resolve the ambivalence to enable integration into physical activities at the right pace for the patient. Commitment language if elicited is likely to support behaviour change (Amrhein et al., 2003). Additionally, non-attendance if acknowledged by referral professionals could be addressed and with support the individual may be able to re-engage, when the time is right. Additional to PA level increases, there may be social gains from a PARS which in turn may support an increase in quality of life for participants who experience isolation (Hardcastle & Taylor, 2001).

The initial *engagement* in PARS is the start of PA behaviour change. James et al. (2009) report that *completion* of a PA intervention in primary care is associated with health outcomes, including reduced body mass and blood pressure, whereas fun, enjoyment and social support are predictors of participation (Allender et al., 2006). This level of detail is missed in quantitative reviews (Taylor et al., 2011). If Dav was supported to engage in AOR by addressing his needs which have been elicited for this study, he may achieve his goal of losing weight to enhance his mobility and to reduce his back pain. Without an understanding and practical application of shared knowledge such as that provided by Dav in this paper, the drop-out rates are likely to remain high (Gidlow et al., 2005) and thus sedentary individuals will remain sedentary.

As we search for the best way to support PA behaviour change, there is a gap in the current research of quality lived experience of participants that are referred to PARS. Due to the nature of non-completers being a hard to reach group of individuals, often referral scheme evaluations present the data of those that have attended the PARS. Even though it may require additional time to gather data, non-completing individuals are best placed to explain what the barriers are to the referral programme and if listened to, their lived experience may positively influence future primary care commissioning and may help to achieve government targets (i.e. LAP). IPA has been chosen in this study to systematically understand the experience of non-completing participants; it would be of value if future qualitative research adopted similar methodologies to enable rigorous systematic review. The approach allows the voice of the individual to be heard, whilst maintaining a rigorous method that is transparent and repeatable.

First author reflections

Throughout the IPA process, the researcher is an important part of the analysis process and reflections captured during the study are shared below. These reflections are extracts from the reflective journal that was maintained throughout the interview, analysis, audit and member check. The key success experienced as the researcher was expressed by Dav during the member check; that he felt at ease emotionally throughout the process of collecting, analysis and reporting the lived experience. Researchers are encouraged to include detail regarding member checks as reported in this paper; confirming trustworthiness and impact for the research participant. It was my reflection that Dav just wanted to be listened to; he identified benefits of behaviour change himself and during the member check had formed clear commitment statements. The value of actively listening to Dav was emphasised by the lack of family understanding and frustration with medical and leisure centre professionals not knowing the whole picture. The clear message from Dav was to health professionals who are considering referring patients to PARS; to explore the mental state of the individual they are physically referring and to better understand the hurdles that may be present for each person, thus tailoring an achievable course for them to navigate with support.

In terms of the methods used, I was reassured with the quality of analysis by Dav's feedback at member check. More case studies of PARS non-attendees are required to build a portfolio of recommendations to enhance service provision. When consid-

ering patient-centred health provision (NHS, 2009) qualitative research and robust research methods such as IPA enable quality data to be collected, analysed and used to better understand and pro-actively improve interventions such as PARS. If local commissioning is to achieve Government targets (i.e. LAP), by listening to individuals who are integral to the behaviour change programmes, the design may better meet their needs, improve efficiency of resources and ultimately get sedentary individuals off the starting blocks.

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